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East Europe Report

ECONOMIC AND INDUSTRIAL AFFAIRS

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INTERNATIONAL AFFAIRS

CEMA RAW MATERIAL AND ENERGY PROGRAM VIEWED

Prague HOSPODARSKE NOVINY in Czech No 40, 1985 pp 8-9

[Article by Eng Alena Nesporova, candidate for Doctor of Science, and Eng Lenka Stastna Czechoslovak Academy of Sciences Economic Institute: "The Basis of Conservation; The Raw Material and Energy Program of the European CEMA Countries"]

[Text] The problem of assuring a fuel, power and raw materials base for efficient economic development in the socialist countries is one of the key areas of cooperation among the CEMA countries. These issues were also discussed in detail at the executive level economic conference of CEMA member countries in Moscow in June 1984 and the 39th and 40th plenums of the CEMA. This article presents an overview of the planning objectives of the individual European CEMA countries related to raw material and energy management for 1981-1985, information concerning the course of their fulfillment, and the potential for cooperation.

The sectoral structure of the individual European socialist countries after World War II evolved under the influence of an industrialization process which included objectively necessary increase in the role of sectors that consumed large amounts of raw material and energy inputs (primarily metallurgy and engineering), as well as under the influence of a new international division of labor, the objective of which was the assurance of the dynamic development of socialist economies based primarily on the internal resources of the community. The growing need for raw materials and energy was met by the rapid development of domestic extraction industries, and later by imports from other socialist countries, above all the USSR. Relatively low prices and a sufficient volume of the delivered resources facilitated the further rapid development of resource-intensive sectors and increased the dependence of the socialist countries on imports of raw material and power resources.

The increase in the prices of raw materials and energy on world markets after 1973 became evident in the national economies of the socialist countries at first only indirectly as a result of peculiarities of price formation within the CEMA, in deficits in trade balances with capitalist countries, while the internal responses of the national economies was minimal. Since 1975, increasing resource prices have gradually been incorporated into the functioning of socialist economies.

On the Trail of Underutilized Reserves

In the second half of the 1970s increased import prices for raw materials and energy were combined with difficulties linked to deteriorating domestic mining conditions. Relatively accessible deposits were for practical purposes exhausted and ongoing mining in practically all the socialist countries including the USSR came to involve rapidly increasing investment outlays. For this reason increases in energy and raw material inputs into the production process declined rapidly during the 1976-1980 period, thereby contributing along with certain structural changes and generally worsening conditions on the world market to a decline in the pace of economic growth in the socialist countries.

The high import intensiveness of socialist economies in raw material imports and the growing investments in domestic extraction industries are significantly hampering national economies and limiting future economic growth. A comparison of the efficiency of utilization of the raw material and energy resources available to the CEMA countries with the same level in the developed capitalist states leads to the conclusion that we have significant potential capacity.

When we compare the development of the energy and raw material intensiveness of socialist and capitalist countries after 1974, we notice that total demands for energy, steel and other materials are declining across the board. The reduction in these indicators in the capitalist countries is, however, more rapid, with especially rapid declines in 1974-1975 and 1981-1982, when there were force restrictions on production especially in heavy engineering sectors because of decreased demand, price and non-price incentives to reduce resource consumption in the production and nonproduction spheres and, finally, the rapid replacement of capital assets that consumed excessive amounts of raw materials and of obsolete equipment with more efficient equipment.

Growing difficulties in providing national economies with the necessary volumes of energy and raw materials will necessarily lead to closer cooperation among the CEMA member countries in this area both in the near and more distant future. The 32nd CEMA plenum in June 1978 approved a Long Range Priority Program for Cooperation in the Areas of Energy, Fuel and Raw Materials, which focused on the accelerated development of nuclear power, the increased mining and better utilization of domestically available fuels, the development of a unified energy system for the member countries, the effective utilization of crude oil and gas, the joint construction of new facilities, and on cooperation in the more efficient utilization of all energy and raw material resources.

Improving the consumption efficiency of these resources and conserving them in the production process has also become an objective of nationwide priority programs in the individual CEMA member countries. Such programs have been formulated as parts of the 5-year plans for 1981-1985 and include projected programs through 1990.

Examples From Individual Countries

Measures adopted in Bulgaria are focused in the energy area on the economical use of existing resources in industry, transportation, construction, agriculture, in other branches of both the material and non-material spheres, and on the use of secondary resources. These measures are designed to cut 620 million leva in costs each year and in the course of the current 5-year plan 12 million tons of standard fuel are to be conserved (this would represent a cut of 25 percent in primary resource consumption in the first year of the 5-year plan).

Five year programs for the more efficient consumption of energy and important raw materials (including the use of secondary raw materials) approved by Hungary are focused both on the more economical use of resources given the use of commonly available production techniques, and on the commitment of additional resources to investment. Emphasis has been placed on the more efficient use of raw materials and energy, on the replacement of obsolete and worn out boilers and furnaces at industrial enterprises and central heating boilers, on the regulation of energy and heat consumption, as well as on the modernization of power generation equipment, on conserving energy during the drying and preserving of fodders in agriculture, etc. If these measures are successful, by 1985 there will be savings of roughly 10 million tons of standard fuel (about 25 percent of the energy resources consumed in 1980).

The CSSR has directed its efficiency enhancing policy in the area of resources at structural changes in the economy aimed at gradually cutting down on raw material and power intensive products and on the development of sectors that can function with a domestic raw materials base, on the introduction of resources conserving procedures, on increases in the quality and technical sophistication of production, and on the implementation of product innovations that make it possible to add additional value to material inputs. Emphasis has also been placed on the more effective utilization across the board of the domestic raw materials, fuel and power base, including nontraditional and secondary resources, on the development of the cogeneration of heat and electricity, and on the improved utilization of modern capital assets at the same time that inefficiently functioning assets in the nonproduction sphere are phased out. For the 1981-1985 5-year plan the task was set of achieving a minimum 2 percent annual saving in fuel and energy, which would correspond to total savings of 12.4 million tons of standard fuel over the 5-year plan (later this task was increased to 14.6 million tons, which amounts to 15 percent of the consumption of primary energy resources in 1980) along with annual savings of 4.5-5 percent in metal inputs into production.

The most comprehensive program of energy and raw materials conservation has been adopted by the GDR. In addition to uncovering as much underutilized capacity as possible in materials usage (by increasing the quality of production and reducing the reject rate and production waste) the entire capital replacement process has been directed at adding greater value to the resources at hand. This is primarily a matter of the restructuring of the national economy in favor of sectors that are less consumptive of energy and material inputs and the broad implementation of R&D findings both in the development

of resource conserving technologies and in the development of products with a greater degree of highly trained labor input and material processing. The basic criterion for evaluating alternatives for the development of the resource base, namely deciding between imported resources, increased domestic extraction, or resource conservation, or effective combinations of all three, is the saving of socially necessary costs. The implementation of all planned conservation measures should result in an average annual decline in the consumption of economically important material resources of 6.1 percent and total savings of 18.7 tons of standard fuel by 1985 (this represents about 15 percent of the energy consumed in the first year of the 5-year plan). Great attention has also been devoted to the use of secondary raw materials--in 1985 30 million tons of secondary raw materials will find their way into production, or about 12 percent of total production consumption.

In Poland improving the efficiency of energy and raw material consumption has been focused on sectoral programs for conserving these resources which in 1983-1985 were intended to reduce the material intensiveness of gross output by 6 percent. The programs developed in the greatest detail were those for conserving electricity. These programs, in addition to economic measures of an organization character, also focused on reducing losses in the distribution grid, on developing the cogeneration of electricity and heat, on the modernization of industrial and residential boiler equipment, and on the gradual introduction of a system for automatically regulating deliveries of heat. The implementation of these programs should this year bring annual savings of about 4.7 million tons of standard fuel. A similar program for increasing the efficiency of propellant consumption in transportation projected savings on the order of 1.5 million tons of standard fuel by 1985.

Congress materials in the USSR projected planned annual savings of 160-170 million tons of standard fuel for the 5-year plan, a figure which was then increased to 200-205 million tons in the comprehensive program for fuel and energy conservation (planned conservation fluctuates in the vicinity of 14 percent of primary response consumption in 1980). Some 38 percent of these savings is to be implemented through increases in electricity generating capacity at nuclear and hydroelectric plants, 25 percent is to come from the formation of the requisite material and technical conditions for declines in average consumption of electricity and heat and for reducing losses in energy distribution, 19 percent is to come from measures designed to reduce the average costs of fuel burned in industrial furnaces and boilers, in industry, construction, agriculture and in residential housing, 8 percent is to come from the use of secondary raw materials, 7 percent from measures to modernize transportation and reduce propellant consumption, and 1 percent from the exploitation of solar and geothermal energy.

Emphasis has been placed also on better management in the area of material resources at all levels of the economy and in all sectors. A planned complex of measures should bring savings of 10.6 million tons of ferrous metals, 7.4 million tons of cement, etc., and overall resource conservation over the five year plan amounting to 40 percent of consumption increases in fuel, ferrous metals and cement.

Turnaround in Material Intensiveness

During the course of the current 5-year plan further problems have arisen in assuring planned fuel, energy and raw material inputs. In 1981 there was a decline in crude oil imports from the USSR to all socialist countries, above all as a result of great increases in extraction costs. The need to substitute domestic energy resources for crude oil (including declines in its use as a fuel and an increase in its use in chemical processing) came into conflict with rapidly increasing investment costs (the percentage of total investment resources allocated to the power generation sector of the CEMA member countries was on the order of 40 percent in the mid-1980s). For this reason total increases in energy and material inputs were likewise well below the level of previous periods (in 1981 the reduced crude oil deliveries resulted in absolute decreases in energy inputs in the CSSR, GDR, and Poland, while such inputs remained level in Hungary and Bulgaria; in the CSSR the decline continued into 1982).

In 1981 there was an overall substantial increase in relative resource savings in comparison with the previous 5-year plan (with the exception of Poland in the energy field). This trend, however, did not continue into 1982, especially in the energy sector. Based on comparative increases in gross social product and national income (in most socialist countries national income is increasing as fast or faster than social product, meaning that production consumption as a percentage of the total is either flat or is declining) it is clear that 1980 represented a turnaround in the development of the resource intensiveness the economies of the socialist countries.

Beginning in 1983 there was a revival of economic growth in all the socialist countries. Published data on material and energy consumption in these countries indicates that the decline in standard consumption of resources overall has continued. For instance, in 1983 consumption in Bulgaria of raw materials, materials and fuels declined by 0.9 percent in comparison with 1982. In the CSSR relative savings of 2.5 million tons of standard fuel were achieved and in the engineering sector alone savings of 4.9 percent in ferrous metals. In Hungary the standard consumption of energy in the economy declined by 2 percent. In the GDR the standard consumption of basic raw materials, energy and materials declined by 7 percent. In the USSR conservation of raw materials, fuel and materials amounted to 2 billion rubles.

In 1984 the CSSR achieved relative savings of 2.5 million tons of standard fuel and 500,000 tons of metal. Hungary reduced its materials consumption only insignificantly but increased electricity consumption per unit of national incomes by 1 percent. In the GDR standard consumption declined of raw materials, materials and primary energy resources by 5 percent. Other countries did not publish their data concerning energy conservation in 1984.

On the whole it may be stated however that increased economic growth in 1983 was achieved at the price of some slowdown in the growth rates of energy and material efficiency in comparison with previous trends, and that the fulfillment of planned tasks and further resource conservation will require the adoption of further measures.

Joint Development of a Resource Base

The executive level economic conference of the CEMA countries, which represented a qualitatively new step in the coordination of economic policy among socialist countries, called attention among other things to the necessity for more effectively joining forces when working to resolve fuel, energy and raw materials problems. The main mechanism and form of cooperation in this area is the coordination of investment and structural policies which can maximize the satisfaction of the requirements and potential of individual countries as well as the entire community.

The conclusions of this economic conference were further worked on and specified in the form of long term comprehensive measures for cooperation between the CEMA countries in the areas of energy, fuel and raw materials through 1990 and on longer range projections as approved by the 39th CEMA plenum in Havana. Here it was stated that the provision of an adequate raw materials, energy and fuel base for the further economic development of the member countries will depend mainly on close cooperation in the extraction and effective utilization of these resources.

The primary sphere for cooperation at present are joint investment projects for the obtaining of new resources. The jointly established enterprises for the extraction and enrichment of energy and raw material resources include the Krivorož combine for the processing of iron ore, the Jamburg gas pipeline to the western border of the USSR, the construction of facilities for the extraction and processing of magnesite in the CSSR, the modernization of the Polish chemical industry, etc.

Cooperation in the area of increasing the efficiency of resource consumption is based on the finding that the efficiency of energy usage from extraction to final consumption amounts now to only about 15 percent, meaning that 85 percent of the energy gained from primary resources gets lost. The same is true of raw material resources. The greatest potential for increasing efficiency lies, therefore, in the extraction and final use of energy and raw materials.

Losses during extraction are estimated for coal at 30-40 percent, for natural gas at 50 percent, for crude oil at 70 percent and for metal ores at 20 percent. The application of new technical procedures can substantially reduce these losses. For crude oil, for instance, the recovery rate can be raised to 60 percent. Cooperation between the CEMA countries in this area can include the delivery of chemical reagents that will increase the secondary and tertiary extraction potential of crude oil deposits and in the deliveries of equipment and assembly work in return for subsequent deliveries of oil. This form of cooperation also includes the establishment of joint enterprises for the mining of coal from coal dumps (such as the Czechoslovak-Hungarian enterprise Haldex and the Polish-Hungarian enterprise of the same name).

Cooperation between the CEMA member countries in the final use of energy and raw materials is being implemented both intersectorally and within the context of specific sectors. Projections indicate that solely through economic and

organizational measures resource savings can be realized within the national economies on the order of 15-20 percent. Exploiting this potential will involve, however, providing clear incentives for work collectives to utilize to the maximum resources at their disposal during production, increase the quality of their work, etc. The basis, however, of efforts directed at adding more value to resources throughout the economy is the implementation of investment level technico-economic programs. Such programs are highly desirable from an economic viewpoint, because currently investments related to increasing the efficiency of consumption of fuels and raw materials are only one half or one third of the investments being made to increase the extraction levels of these resources.

Cooperation at the sectoral level is focused above all on conserving resources through innovations in industrial processes. In metallurgy for instance, which is one of the most materials intensive sectors, large savings in both energy and pig iron can be achieved by installing modern equipment and techniques in metals production (continuous casting of steel, the converter and electric furnace production of steel, precision powder metallurgy castings, etc.). In the construction materials industry significant resource conservation may be achieved by replacing the current "wet" technique of cement production with dry production procedures. This change alone will make possible 50-70 percent reductions in standard energy costs. Similar measures have been formulated and are being implemented gradually within the chemical industry, in construction and housing management, in transportation and in agriculture.

Energy management for socialist countries in the 1980s will be characterized by a reduction in the role of crude oil, which will be used more extensively in the chemical industry, with the shortfall made up with solid fuels, nuclear power and natural gas. The process involved in the chemical processing of crude oil must, however, be improved because in comparison with the procedures in use in developed capitalist countries we continue to be at a low level of sophistication (propellant production accounts for 40-50 percent of petroleum products in the CEMA, and 75-80 percent in the USA).

Nuclear power will represent the primary source of increased energy outputs in the future. Even though the investment costs involved in nuclear power plant construction are large, their operating costs are substantially lower than those of traditional power plants. In 1982, for example, the generation of 1 kilowatt hour of electricity at the Jaslovske Bohunice nuclear power plant was lower by a factor of 2.4 than the cost at a power plant burning brown coal. Nuclear power plants within the CEMA were operating at the end of 1983 with a total capacity of 25.8 gigawatts, while in 1990 their projected capacity of 120 gigawatts is intended to cover 15-30 percent of the total electricity generated in specific countries (the figure is expected to be 40 percent in Bulgaria). Nuclear power is being developed on the basis of contracts for multilateral international specialization and cooperative production and mutual deliveries of equipment for the nuclear power plants. These agreements provide that 50 percent of this equipment will be produced in the USSR and the remaining 50 percent by the other CEMA countries.

An important area of cooperation in power generation is the construction of an integrated power generation system serving the member countries. Since completion of the 750 kilovolt Vinnica-Albertirs line in 1979, construction has been proceeding on the Chelnicka nuclear power plant and another 750 kilovolt line from this power plant to Rzeszowa. The CSSR is also participating in these projects. In addition to increased electricity deliveries from the USSR to the member countries there is also an intra-systemic impact from the combining of load diagrams and power reserves that must also be taken into account.

Nontraditional Resources

Cooperation in the area of nontraditional power resources is also promising. The generation of electricity in hydro power plants is highly efficient from an investment viewpoint, because there is still considerable underutilized water resources for this purpose. In fact, the utilization level of hydro power resources has been estimated at 26.9 percent in Bulgaria, 5.5 percent in Hungary, 75 percent in the GDR, 27.2 percent in Poland, 15.6 percent in the USSR, and at 42.2 percent in the CSSR. The exploitation of solar, geothermal, wind and biomass generated power is so far only economical on a small scale, and primarily in climatic areas appropriate for one or another such use. This is in part because costs for the energy equivalent of one barrel of crude oil fluctuates from two to four times as high as the current world market price for crude oil for biomass generated power, while solar or wind energy prices are higher than this price by a factor of three to five. This is the reason that only about 0.2 percent of our current energy needs are obtained from nontraditional sources. Increasing this share will depend on resolving the technical problems connected with making the large scale use of these resources economically viable.

Secondary raw materials obtained from wastes represent an important nontraditional raw material and energy source the processing of which is highly effective. In addition to an absolute reduction in the consumption of primary raw material resources such processing usually entails considerable savings in energy and other costs and also usually has a less intrusive environmental impact. Socialist countries continue to have considerable underutilized capacity in secondary raw material processing. The GDR has made the most progress to date in their utilization through an extensive and well developed program for the effective and economical utilization of wastes.

Differences in the processing of secondary raw materials between the GDR and the other socialist countries may be shown in several examples. The GDR turns 75 percent of its scrap iron back into steel, while in the USSR the figure is 15 percent. The GDR produces 47 percent of its paper from waste paper, while the figure for the USSR is only 24 percent, and 27 percent in the CSSR and in Hungary. The GDR produces 30 percent of its lubricating oils from used oil (the figure for capitalist states is a surprising 50 percent) while Hungary only produces 2 percent from this source. Some 3.6 percent of the cinders and ash from the thermal power plants in the USSR are utilized while the figure for the GDR is 26-27 percent. Increasing the utilization of secondary raw materials by the socialist countries depends mainly on the

construction of enterprises to treat and process them and on the creation of a corresponding system of economic and financial mechanisms to provide incentives for collecting and using wastes throughout the national economies. The contributions made by such measures will certainly exceed their costs by a factor of several times.

Optimizing Structure as a Solution

The basis of a resolution of the fuel, power and raw material problem at the macro level lies in optimizing the sectoral structure of the CEMA member countries so as to make the best use of their domestically available raw materials. This involves a comprehensive approach to the efficient distribution of raw material and energy incentive sectors within the framework of the CEMA that will maximize the overall economic impact and stimulate every country to develop as much as possible those sectors using the domestic natural resource base and the comparative advantages of the country in question. The objective of progressive structural changes is the development of a sectoral and expertise structure for every country that will facilitate, when integrated into an international division of labor, rapid national economic development and increases in the standard of living while conserving resources as much as possible.

A long range strategy for resource-conserving economic growth is closely related to the process of national economic intensification and the broad utilization of R&D findings in production and consumption. R&D and economic cooperation, according to an agreement reached at the 39th CEMA Plenum in Havana is being implemented in 5 priority programs: electronics, comprehensive automation, nuclear power, new material and technology development, and biotechnology. These new developmental priorities are important because they directly and indirectly alter internal sectoral and expertise structures in the direction of products with a high technical and qualificational input, products which add significant value to both raw material and energy inputs. The value added per unit of primary material in microelectronics and biotechnology is on the order of 1:1,000. These new fields exert a strong multiplier effect, because their products are used in all areas of the material sphere and more and more in the nonproduction sphere as well, on the technical sophistication and effectiveness of the entire economy and contribute to the more effective use of primary and secondary raw materials.

The thorough implementation of all of the above medium and long range objectives will require changes in the existing planned management systems for the economies of the socialist countries and related financial and pricing system changes that will offer incentives at the macro as well as the individual enterprise level for improving the utilizational efficiency of resources and facilitate the rapid introduction of raw material and energy efficient technical and production innovations. The scope and speed of this implementation and the practical impact of these changes will in the future more and more determine the pace, quality and resource effectiveness of economic growth.

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BULGARIA

MINISTER OUTLINES SERIOUS PROBLEMS IN CHEMICAL INDUSTRY

Sofia POGLED in Bulgarian 23 Sep 85 pp 1, 4, 5

[Interview with Georgi Pankiv, minister of the chemical industry, date and place not specified]

[Text] The chemical industry holds first place among Bulgarian exports to industrialized nations. We now create products worth 7 billion 300 million leva annually. On a national scale this is 17.5 percent of commodity production, or 23 percent of the nation's general profit. Over 22.3 percent of chemical production is exported. Let us begin our conversation with Georgi Pankov, minister of the chemical industry, from this point, since around 90 percent of our national income is already being formed by our nation's participation in the international division of labor, and the chemical industry occupies a very significant place.

[Question] Do we have the possibility now and in the future of becoming competitive in the international marketplace?

[Answer] In order to be competitive in international markets the primary concern is quality that corresponds to the requirements of international standards. And what is more, we must decrease costs, lower the primary costs through economizing on energy, materials, and raw materials. Our products are well accepted by firms that are known worldwide. Let me cite analgin as an example, Bulgaria is one of the world's largest producers of analgin, 2,000 tons annually. We have succeeded in gaining a foothold in world markets thanks to quality, which is higher than the requirements of English pharmacopeia. We have stable markets in more than 80 nations.

[Question] What is the strategy for our chemicals? Where are we headed, having in mind international competition?

[Answer] The basic aim of development is affirming the chemicalization of the national economy as one of the main directions of scientific-technical progress. Expanding the raw material base in each of the branches through more widespread penetration of chemical technologies, processes, and products in the economy and domestic life, and expanding the export capabilities.

This means that the chemical industry must be developed on the basis of avant-garde base technologies for a comprehensive and profound transformation

of raw materials, expanding the existing raw material base, and creating new chemical products with given or unique traits, necessary for the branches of the national economy, for export. It is necessary to raise the efficiency of large-tonnage and small-tonnage chemical production, chiefly through broader implementation of standardized (universal) apparatuses, process-technological modules and technologies, and comprehensive automation and control of technological processes on the basis of microprocessor technology.

Development in subsequent years will take place primarily in the so-called "qualified chemistry," or as some call it "small-tonnage" or "scientific-volume" chemistry. We foresee constantly increasing products from profound transformation of raw materials amounting to 70 percent of production by 1995.

[Question] Could you explain for the non-specialists the concept of "qualified chemistry?"

[Answer] This includes production of various groups of chemical products which are used in comparatively small quantities. Highly qualified labor is being put into this type of production and most of all into scientific research, for the development and implementation of technologies. Normally this applies to products which are greatly transformed from the original raw materials and other materials. Mostly they are a result of complex chemical processes with high requirements for quality indicators. A great number of them play a role as auxiliary means for perfecting and intensifying technologies and improving product quality. They are used as dyes, auxiliary means in industry, catalyzers, chemical means of plant protection, reactive and chemically pure substances, medicines, perfume-cosmetic products with domestic use among the populace, etc.

Special attention is being paid to rapid development of the pharmaceutical and perfume-cosmetic industries, with broad application of modern biotechnological processes. Bulgaria now possesses all modern antibiotics and preparations based on them for human and veterinary medicine.

We foresee implementing biotechnological processes in organic synthesis for obtaining biologically active substances, such as alkaloids, peptide hormones (insulin, interferon), etc. We will take advantage of the opportunities for biotechnology and gene engineering for creating new raw materials and materials, for securing biological means in the struggle against pests, for raising the output and productivity of livestock breeding, as well as creating effective medicinal preparations.

[Question] What are the prospects for more traditional chemistry?

[Answer] The other chemistry, so-called mass production chemistry, is in the process of renewing capacities, with a view toward reducing costs for power and materials and increasing the quality of production. This renewal must be carried out along the basic lines of the Ninth 5-Year-Plan. 25 percent of the existing capacities will be reconstructed and modernized through the application of the latest achievements of scientific-technical

progress, leading to a reduction of 12 percent in energy consumption, 3 percent in consumption of materials, and 17 percent of consumption of labor, with a simultaneous increase in the quality of production. 120 new products and 60 new items will be adopted annually. And chemical productions will be developed in conjunction with existing combines through perfection of technologies, renewal of capacities, and adopting production of new products, items, and preparations.

[Question] Bulgaria is not rich in raw materials. How will this reflect on the development of chemistry?

[Answer] We are counting on even greater processing of materials and raw materials on the basis of broadening the nomenclature. The main thing that will play a major role in the development of chemistry is implementing scientific-technical achievements. This is our question number one. During this 5-year-plan we are working on around 4,000 subjects. For the 5-year-plan generally, around 3,000 subjects and assignments will be implemented, with a general effect of 480 million leva.

[Question] How does this compare with worldwide experience?

[Answer] In addition to our own developments, in line with scientific-technical progress, we have quite broad contacts with the socialist countries and are jointly developing subjects. Also along the lines of international foundation, we are sending some of our specialists to the developed capitalist countries for participation in specialization and retraining. Chemistry is a branch which is receiving widespread automation and mechanization. We are prepared to develop programs, to design, to install, and to start up control systems. Perhaps you know that we have a joint project called "Systematic" with the world renowned Honeywell firm. We cooperate successfully, as the joint friendship is implemented and such systems are started up in other countries. We also teach foreign specialists. We have now signed an agreement with the Dow Chemical industrial giant for purchases and sales, as well as cooperation. We are utilizing the experience, licenses, and technologies of other firms as well.

Another problem for chemistry is the participation of our machine building industry in the renewal of capacities. It is, however, insufficient and it makes our efforts more difficult. Everyone knows, for example, what the quality of our paper cardboard is like. We could change this situation in 6 months and could produce superfine paper and cardboard. But there is a question, however, of outfitting existing installations with new equipment. Or let us take plastics. For processing them, we need modern machines, which can ensure the production of high quality items with the necessary functionality and good external appearance. Such machines, however, are not produced in Bulgaria or in the member nations of the CMEA.

[Question] What are the difficulties you encounter in implementing scientific-technical achievements?

[Answer] There are not enough effective stimuli. For implementing technical achievements, management has to pay from the Wage Fund. Which managers

will want to take money from that fund to pay those who do implementation? The wage fund must not be defined as a source for paying for creative awards in economic organizations. Stimulus must come from other funds which we have, such as, for example the Development, Technical Perfection, and Economic Risk Fund.

And secondly, the managers of our economic organizations pay attention to the plan, they look at the plan. The plan, of course, is a state obligation. But the bad thing is, however, that there is a "struggle" to get a lower plan, so that wages can be guaranteed in this way. We have not perfected the mechanism for turning this "struggle" to face the market, that is, to struggle for entering the market, for expanding the markets, for raising the profitability of goods which we produce and sell. And if one management broadens the nomenclature, the presence in the markets, their material rewards grow on this basis. And here will we see which management is active, which one is tuned to think and act in a new way, to struggle for quality in production, for efficiency of production, etc.

[Question] Why are we so wasteful, Comrade Pankov, in the use of liquid fuels?

[Answer] For us oil is indeed gold, since we have none. Unfortunately Bulgaria is one of those nations which uses a lot of liquid and gas fuels for the production of electric and thermal energy. When we are speaking about scientific-technical progress, about efficiency and profitability under our conditions, this is not acceptable at all. The supply of these raw materials and materials to Bulgaria cannot be increased. Resources, especially petroleum resources on a worldwide scale, are also limited.

In the production of thermal energy, for example, efficiency is at its lowest when we use liquid and gaseous fuels. And we are unfortunately using huge quantities precisely there. And since the effect from the point of view of working with this fuel is easily obtained, when compared with coal, let us say, the cadres are attuned to operating this way: everyone looks for gas or oil, gas oil or fuel oil, without taking into account the efficiency for the national economy as a whole.

[Question] What is the problem with chemical fibers?

[Answer] Our nation has built all the capacities for the production of all types of fibers used in light industry.

The quality of chemical fibers has no limit. So far we have not equalled (and I am speaking about the world here too) the structure and quality of natural fibers such as cotton and wool. This is because our efforts are directed toward modification of the basic types of chemical fibers and silks with a view toward obtaining fibers with improved hygienic and exploitation characteristics, with greater hygroscopic and dyeing affinity, highly flexible and resistant to decomposition.

In regard to the quality of chemical fibers in all nations, and our country is no exception, there are debates between light industry and the chemical industry. Most often we get signals about lessened porosity of chemical fibers during the summer months.

The lack of efficient climatic installations at most of the textile enterprises is a reason why the production sites are not able to maintain the necessary temperature-humidity balance, which is extremely important for the normal conduct of textile processing of the fibers. At few other places in the world is the practice of processing synthetic fibers (independently or in combination with other fibers) carried out in non-climatized rooms, as it is here.

As we know, because of their nature, during processing chemical fibers accumulate a significant quantity of static electricity, whose influence cannot be eliminated by applied preparations that do not work under necessary temperature and humidity conditions. It turns out that batches which have demonstrated low porosity at the textile enterprises are reprocessed quite well at an installation of our chemical combine which maintains the necessary climate.

[Question] What about the so-called "standards?" Are they not the laws of production?

[Answer] The base nomenclature of the CMEA for the essential indicators of chemical fibers contain five, at the most seven, obligatory indicators. But light industry "loads" us with 18 or 20 indicators for various assortments and all have maximal value. But fibers are a complex material. If you raise one indicator, for example, strength, that might come at the expense of another indicator. And thus we propose goal-oriented standards, which can regulate the indicators, depending on what kind of processing is designated for the fibers.

[Question] Recently the fibers of Svilozha in Svishtov have been criticized a good deal.

[Answer] People have recently been talking a lot about Svishtov silks. We export them to the world market, and without this there would be problems with quality, including the various hues during dying, about which our light industry advertises most often. Perhaps there, where they are processed, they have more modern technology and equipment. As far as Svishtov polynosic staple fiber production is concerned, we have a great problem with the basic raw material, cellulose. It is well known that polynosic fibers achieve high indicators when they are produced from coniferous cellulose.

Beech pulp, with which we work, is a compromise in regard to the quality indicators characteristic for these fibers. Recently, along with the beech pulp, there has been a supply of oak pulp. No one has ever produced high quality fibers from oak, neither can we produce them. It is necessary to forbid the Ministry of Forests and Forest Industry from sending oak pulp. We have made a proposal to the Council of Ministers to supply production of fibers only from beech pulp.

Some people avow that beech pulp is in very short supply. Fine, but we use only 17 percent of this resource. The other 83 percent is used for less highly qualified consumption. Let them use oak pulp instead of beech pulp.

[Question] How will chemistry be used in construction?

[Answer] We proposed flooring. This item is prettier and better. Especially for the construction program, we took on and will carry out everything which the builders require of us. For the outside paint, we feel that by maintaining the technology for applying paint, we can guarantee 8 to 10 years of the paint not changing color.

[Question] Two major questions relate to preserving the environment: first, polluting the soil with the refuse from the chemical industry, and second, artificial fertilizers are partly toxic.

[Answer] Do not put us in the group of the worst polluters of the environment. By the way, 14 percent of the capital investment in our industry goes toward water purification and other measures. Bulgaria is the fourth country in the world in having the lowest tetraethyl content in gasoline. During the next 2 to 3 years we have to come up with gasoline without ethyl, chiefly for the large cities, because about 60 percent of the pollution in the cities comes from transportation. With this resolution, we will essentially move to the level of those countries with the strictest standards.

In regard to fertilizers, Bulgaria is one of the nations where agriculture uses the most fertilizer, and nitrate formations are already evident in the water. But these are fertilizers used everywhere, there are no others. Perhaps we have to look more closely at the norms for using fertilizers. Chemical and biological methods, process, and technologies are the basis for purifying all types of waste, and chemical products can pollute the environment when they are used in an unskilled way.

[Question] Now, while we are talking, why is there no baking soda in the stores?

[Answer] We produce enough, and we are one of the greatest exporters. The fact that we have none in the marketplace is a commercial matter. They say that there is no nail polish remover for sale either. We produce 20,000 tons of acetone, which is used in the production of nail polish remover. But the needs for Bulgaria are around 100 tons. According to the plan, we have fulfilled our obligation. It is clear that we are speaking here about a better commercial mechanism. For example, we have fulfilled our annual agreement for toothpaste, Bulgaria is one of the largest producers of toothpaste. But they were beginning to say that there was no Pomorin. We export 40,000 tons of toothpaste, we have 52 types. That is a more than sufficient quantity for the domestic market.

[Question] The conversation has covered quite a lot of ground, in terms of accomplishments and difficulties. What can you report about the greatest achievements of our chemical industry?

[Answer] We have attained a high level in the perfume-cosmetic industry. Our creams, perfumes, and eau de colognes have received extremely high marks. In Spain we received an award for the highest achievements in the perfume-cosmetic industry. We occupy one of the top spots in the world in terms of consumer value of creams, perfumes, etc. Our problems are chiefly in the internal formation of production.

We have some achievements in the production of antibiotics for both veterinary and human medicine. We produce almost all types of modern antibiotics. We have achievements in the production of nitrate fertilizers, the synthesis and processing of polymers, automobile tires, in the lacquer and paint industry, greater refinement of oil, etc.

[Question] As journalists we are very interested in the question of paper, Comrade Pankov.

[Answer] I read how you wrote in the newspaper, asking why the plant in Miziya is being closed. When we speak about the style and method of working, the ultimate, most characteristic note is a scientific approach to a problem. If you stop the process, you have to be interested in what will take place: will there be sufficient paper for writing, will there be enough for school notebooks...

[Question] Will there be enough rubber for car tires?

[Answer] Every year we increase production by 40,000. No one can foresee such growth in this branch. And this is linked to equipment. We import machines to increase the production of tires for cars. Next year we will introduce new capacities for producing 250,000, including tires with metal breakers, which we feel will be sufficient to satisfy the demands. In terms of other tires, for buses and trucks, there are no problems. We are even exporters of such tires.

[Question] They say that in other countries they are making a decisive step toward using mostly liquid fertilizers. What is being done here?

[Answer] Liquid fertilizers are being applied in many countries, but for now they have only a quite limited application in our country. Liquid fertilizer is being produced in Stara Zagora for maintaining plant leaves. Its application has given very good results. We are prepared at the combines in Vratsa and Stara Zagora to begin production of liquid nitrate fertilizer on the basis of ammonium nitrate and carbanide. Agriculture is not ready to implement it, and it seems to me that many specialists are not creatively attuned to it.

[Question] Since it is so effective, is it that difficult to make it?

[Answer] Why should you be surprised? A number of questions about the scientific-technical process are being devoured by the bureaucracy. There is no greater enemy of technical progress than it. Changing to a new way of thinking is not so easy: much greater activity and initiative are

needed, we have to take risks in implementing innovations. And material stimuli are needed. But some prefer to distance themselves from what is new. They receive their salary and do not want to take risks. Naturally such people have to be influenced in an economic way, to be oriented toward the market. These people struggle for position and expansion of territory, and that means new nomenclature to create high quality, struggling with the competition. A similar orientation will compel them to think about innovation, about scientific-technical progress, about their style of working.

[Question] Do you believe that everyone will think this way in the near future, especially those on whom scientific-technical progress depends?

[Answer] Now everyone is widely studying and considering the innovative visions and approaches formulated in the resolution of the February Plenum of the Central Committee of the Bulgarian Communist Party, and I am convinced that we have the resources and the capabilities of turning them into deeds.

I am convinced of the breakthrough in the thinking of those on whom scientific-technical progress in the chemical industry depends. Naturally, those who cannot readjust should simply not stand in the way of resolving these great problems, they have to stand aside and not hinder others.

And what kind of style are we talking about?

A style that is characterized most of all by a scientific approach, a deep analysis. This style includes socialist drive and activity, the unity of thoughts and deeds.

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BULGARIA

PROBLEMS AT MARITSA-IZTOK THERMOELECTRIC STATION OUTLINED

Sofia RABOTNICHESKO DELO in Bulgarian 18 Oct 85 pp 1, 3

[Article by Stanislav Kolev: "Let Us Not Hurry to Call a Halt"]

[Text] A great share of the responsibility and efforts for speeding up the introduction of new energy capacities and ensuring reliable output from the existing ones belongs to the Maritsa-Iztok economic mining and power combine, not only because it produces around 20 percent of the nation's electric power, but also because of the high economic efficiency obtained by using low-caloric lignite coal.

During the most recent period the 5th power block in the expanded Maritsa-Iztok 2 Thermoelectric Station (TES) came on line. In a very short time the 6th power block at the station was also constructed and is now working in parallel with the fifth.

Work is continuing on excavation, for the construction of the furnace and cooling tower of the future 7th and 8th blocks. Together with this, during the summer months a huge, unprecedented repair campaign began for the existing electricity producing capacities. In addition to Energoremont and Energomontazh, other organizations included in this work were the Stara Zagora, Khaskovo, and Sliven Okrugs, which sent out 600 commissioned workers in all for each of the 45 days. The support shown by the Ministry of Machine Building, from the enterprises in the okrug, found expression in the additional quantitative spare parts and non-standard equipment produced for the combine's needs. What remains after balancing the work carried out up to now?

The basic part of the repair work was concentrated on the Dimo Dichev TES. The original lag was overcome. The three power blocks are now fully restored and are working at their nominal load. People are now diligently working on the 4th power block, which will go into operation on the eve of the 7 November holiday. During the summer the program for preventative repairs on the equipment was carried out, including basic and mid-level repairs. This greatly reduces accidents and ensures reliable operations.

In terms of the Purva Komsomolska TES, things are more complex. Precisely because it is the first, because its 25 years make it an oldster, very little can be expected in the future from the capacity of its turbines. But for now four of the eight cauldrons have been restored within the limits of what is possible.

At the Maritsa-Iztok 2 TES, mid-level repairs were carried out on the 1st and 3rd power blocks. Along with the 2nd, basic work is now beginning on the 4th block, which was last reconstructed in May 1982. It is expected that this block will go into operation by the end of the year.

Beneath the smooth surface, as it seems at first glance, of what has been done, there are, however, acute questions which have not been concealed from the gaze of the combine's leadership, but evidently the efforts needed to eliminate them have been inadequate. The basic task, which cannot be put off, is to normalize the work of the old portion of the Maritsa-Iztok 2 TES. For this to come about, it is necessary to carry out strictly the power supply program noted together with the Ministry of Energy for fully securing labor and material resources, for streamlined and constant organization of work.

Ash removal at the Dima Dichev TES is in a very difficult situation. If the six pumps needed at the second level of the excavation stations are not developed and installed in time, spewing of ashes will turn into a problem with serious consequences.

Also alarming is the situation in the drying workshop of the Purva Konsomolska TES, whose basic repairs will again be removed from the agenda because of a shortage of sufficient workers.

The question of supplying smoke suction devices, fans, and crushers for fine crushing of coal at the three stations continues to be a fullblown problem. The existing motors are extremely worn out and every day they are ready to create unpleasant surprises for the personnel operating them.

In the final analysis, despite the restorative work carried out on the power supply equipment, the end of the task has not come, work must still be done to carry it out, without omissions, and without destroying the organization created. If we surmount the barrier of narrowly departmental interests, we will achieve the true response to the most important, and socially significant question: the contribution of this combine's power supply engineers to the stabilization of the nation's energy system.

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CZECHOSLOVAKIA

AUGUST 1985 ECONOMIC RESULTS SUMMARIZED

Prague HOSPODARSKE NOVINY in Czech No 39, 1985 p 2

[Commentary by Engineers Marie Hormannova and Alena Polakova, Federal Statistical Office: "August 1985"]

[Text] In terms of the national economy's basic indicators, the August results have contributed toward bringing economic development closer to the targets of the annual state plan.

So far as the creation of material resources is concerned, the basic indicators' growth rate, converted to the same available working time (there was one workday less in August than in the same month last year), was higher than the planned annual growth rate. This despite the fact that the August production tasks have not been fulfilled entirely, because more workers were on vacations. The difference in the available working time is projected also in the development of the basic indicators for January through August: there were two workdays less during this period as compared with the same period last year.

Industry's gross output in value terms was 56.7 billion korunas in August, an increase of 0.1 percent over August of last year. The average daily output increased 3.3 by percent that month. The industrial enterprises as a whole fulfilled their monthly production plans 99.8 percent (the shortfall in comparison with the plan is roughly 130 million korunas). More than 36 percent of the enterprises failed to fulfill their August gross output plan.

Industrial output in January through August rose by 2.9 percent over the same period last year (average daily output rose by 3.9 percent) and reached 455 billion korunas. Fulfillment of the gross output plan for the first eight months was 100.5 percent, even though more than 30 percent of the enterprises fell short of fulfilling their production tasks for the period. By the end of August, fulfillment of the annual state plan's gross output was 65.2 percent.

The greatest increases in output for January through August were in the electrotechnical industry (6.9 percent), general engineering (6.7 percent), and within light industry in the clothing industry (4.3 percent).

From the beginning of the year through the end of August, the plan for the output of the principal industrial products was fulfilled for all types of products, with the exception of crude steel. In all during the first eight

Basic Indicators of National Economy's Development in August 1985.
Increases Over Comparable 1984 Period (in percent)

	Aug.	Jan- Aug.	State plan ¹
Centrally Administered Industries deliveries for:			
- investments, at wholesale prices	.	8.9	.
- domestic trade			
at wholesale prices	.	1.7	.
at retail prices	.	0.5	.
- export to socialist countries			
at wholesale prices	.	6.6	.
at f.o.b. prices	.	7.3	.
- export to nonsocialist countries			
at wholesale prices	.	2.6	.
at f.o.b. prices	.	1.2	.
- other sales for productive consumption and operations, at wholesale prices	.	3.9	.
volume of industrial production	0.1	2.9	2.9
average number of employees	0.6	0.6	0.9
labor productivity based on gross output	-0.4	2.3	2.0
Construction			
construction work performed with own personnel	1.9	0.6	0.7
average number of employees	0.8	0.3	0.6
labor productivity on construction's basic output	1.1	0.3	0.1
housing units delivered by contracting enterprises	6.0	3.4	25.3
Procurement			
slaughter animals (including poultry)	-8.2	-2.0	-1.1
milk	2.0	0.7	-2.1
eggs	-4.1	0.6	-6.4
Retail Turnover			
main trade systems	2.6	3.9	4.1
Foreign Trade ²			
export to socialist countries	.	4.3	3.4
export to nonsocialist countries	.	-0.9	-2.2
import from socialist countries	.	4.8	5.0
import from nonsocialist countries	.	-3.1	9.1

1. Relative to actual 1984 results.

2. Data from state plan's implementation, in accordance with the methods for preparing the 1985 plan (pursuant to CSSR Government Decree No 308/1984).

months, 52.2 billion kWh of electricity was generated; furthermore, 6.483 million tons of pig iron, 10.154 million tons of crude steel, 7.345 million tons of rolled stock, and 17.524 million tons of bituminous coal were produced.

Labor productivity in industry (based on gross output) increased at a faster rate in January through August (102.3) than what the annual state plan calls

ror (102.0). The increase in the number of workers during this period was 0.6 percent, which is lower than the rate of increase in the annual plan (0.9 percent).

Adjusted value added in industry during January through August reached 184 billion korunas, an increase of 4.2 percent over the same period of last year. Fulfillment of the plan of adjusted value added for the period from the beginning of the year has been 99.9 percent. Labor productivity based on adjusted value added has increased by 3.5 percent.

The planned tasks in marketing the industrial output have been fulfilled well on the whole, in all principal destinations of the deliveries, even though some of the enterprises fell short of fulfilling their marketing plans. In the same way as in the preceding periods, the most significant overfulfillment of the marketing plans occurred in deliveries for investments, and in deliveries for export to socialist countries. At the same time, more than 28 percent of the enterprises that have this indicator in their plan, fell short of fulfilling their deliveries for investments in January through August. In the case of deliveries for export to socialist countries, the proportion of such enterprises is roughly 20 percent. Through the end of August, more than 40 percent of the enterprises fell short in their planned deliveries for productive consumption and operations.

In construction, the volume of construction work that the construction enterprises performed with their own personnel increased by 1.9 percent in August over the same month of last year. Average daily output increased by 6.5 percent. Fulfillment of the construction enterprises' planned tasks was 99.4 percent in August.

In January through August, the volume of construction work in place increased by 0.6 percent over the same period of last year, and the average daily output in construction increased by 1.8 percent (the annual state plan calls for an increase of 0.7 percent).

Fulfillment of the economic plans for the volume of construction work that the enterprises performed with their own personnel was 99.6 percent for the first eight months. At the same time, more than 47 percent of the construction enterprises fell short of fulfilling their production tasks during this period. About 65.0 percent of the planned annual volume of construction work has been fulfilled by the end of August.

Based on the volume of construction work in place, labor productivity at the construction enterprises increased by 0.3 percent from the beginning of the year through the end of August, whereas the planned annual increase is 0.1 percent.

Adjusted value added in construction was 3.2 percent higher in January through August of this year over the same period last year. Labor productivity based on adjusted value added rose by 2.9 percent.

The volume of freight hauled by public carriers was 5.9 percent lower in August than the same month of 1984. This includes a 1.4-percent decline in the volume

of freight carried by the CSD [Czechoslovak State Railways], and a 9.9-percent drop in the freight volume of the CSAD [Czechoslovak State Motor Transportation]. In January through August, the freight volume was down by 4.0 percent over the same period of last year. Fulfillment of the economic plans for January through August was 96.6 percent. This includes 96.1-percent fulfillment by the CSD, 97.3-percent by the CSAD, and 92.7-percent in inland navigation.

In crop production, the grain harvest was completed on 95.4 percent of the grain acreage by 10 September. By that date, 101,000 hectares remained to be harvested in Czechoslovakia. The clearing of the straw is likewise continuing successfully, with about 86.4 percent of the acreage cleared. By the same date, the harvesting of hops has been completed in the principal hop-growing regions; and the seeding of rape was nearing completion, with 96.5 percent of the acreage seeded.

In livestock production, the August procurement schedule has been fulfilled as follows: 96.5 percent for slaughter animals (including 92.7 percent for slaughter cattle, and 99.2 percent for slaughter hogs), 102.1 percent for slaughter poultry, 102.5 percent for milk, and about 104.5 percent for eggs. During the first eight months as compared to January-August 1984, the procurement of slaughter animals, poultry included, was lower by 24,000 tons (a decline of 2 percent); but the procurement of milk was up by more than 29 million liters (an increase of 0.7 percent), and the procurement of eggs was up by 12 million eggs (an increase of 0.6 percent).

In domestic trade, the retail turnover's growth slowed down in August, in practically all organizations of the main trade systems. In August of this year the retail turnover was below its August 1984 level, and far below the growth rate attained in July of this year, in the following trade organizations: Fruit and Vegetable Trade (a decline of more than 9 percent in August, a 17.7-percent increase in July); Textiles (a 1.8-percent decline in August, and a 0.4-percent increase in July); and Trade in Industrial Goods (a decline of 0.6 percent in August, an increase of 4.3 percent in July).

In foreign trade, planned total export and planned export by individual groups of countries rose faster in January through August than the annual state plan specifies. In January through August, 62.0 percent of the annual state plan's export has been fulfilled (including 62.3 percent of the export to socialist countries and 63.3 percent of the export to nonsocialist countries).

Total planned import, and planned import by groups of countries has failed to attain in January through August the growth rate that the state plan sets for all of 1985. During the first eight months, 59.5 percent of the annual state plan's import has been fulfilled (including 63.3 percent of the import from socialist countries, and 50.8 percent of the import from nonsocialist countries).

On 31 August, the amount of currency in circulation reached 55.9 billion korunas, as compared to 53.2 billion korunas at the same time last year.

1014
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CZECHOSLOVAKIA

ADJUSTED VALUE ADDED INDICATOR EVALUATED

Prague HOSPODARSKE NOVINY in Czech No 36, 1985 pp 8-9

[Eng Jitka Vanova, Czechoslovak State Bank, main institute for the CSR: "What the Adjusted Value Added Indicator Shows and What it Does Not"]

[Text] Recently there has been much discussion of the use of the adjusted value added indicator and its efficiency. Theoreticians have been cautioning against the restricted predictive capability of this indicator, especially with regard to the development of the desired proportionality in the national economy. This article intends to demonstrate the validity of this point of view, while acknowledging that adjusted value added information also has numerous positive aspects.

One of the main reasons for introducing adjusted value added into economic practice was to reduce the material intensiveness of production with the achieved savings being passed right through to profit figures. A link was developed between adjusted values added and economic incentives offered to work collectives. The total volume of wages payable resources was with wages being a set percentage of adjusted value added.

Table 1 outlines the evolution of material costs (excluding depreciation and the residual prices of retired capital assets) in comparison with increases in the output of the CSR economy.

Table 1. Material Costs and outputs in the CSR (in percent)

	<u>1981</u> <u>1980</u>	<u>1982</u> <u>1981</u>	<u>1983</u> <u>1982</u>	<u>1984</u> <u>1983</u>	<u>1985</u> <u>1980</u>
Material costs excluding depreciation	99.9	99.4	101.6	102.0	102.9
Outputs	101.2	100.7	102.5	102.7	107.3

There were relatively large savings in material costs in the first 2 years of the 5-year plan. The magnitude of these savings declined beginning in 1983 even though they remain an important factor influencing increases in profits. It may be stated then that the enterprise sphere reacted immediately to the introduction of the adjusted value added indicator. Measures emanating from

the center, it should be noted, also played a significant role in these reductions. These measures included physical limitations on supplies of fuels, power and selected raw materials and materials.

Conflicts Over Counter Plans

Beginning in 1983 the pace of production began to speed up and in conjunction with this outputs began to increase as well. As noted above, however, savings in material costs began to decline.

That the potential remains for further savings is indicated by the existence of another systemic measure in the economic management system known as counterplanning. One of the objectives of counterplanning is to support efforts to reduce the material intensiveness of production even more than provided for in the 5-year plan. The counter plan makes it possible to adopt more ambitious targets for adjusted value added (within the context of the resources and constraints designated in the 5-year plan) thereby increasing the magnitude of the basic component of wages over the amount listed in the plan breakdown. This is a technique which applies to the formulation of plan drafts for individual years, and which therefore is practiced at those times when negotiations are under way to bring supplier-consumer relationships into balance (especially by reducing requirements for deliveries of those raw materials and materials that will be conserved).

The experiences of recent years with the attitude of enterprises to the formation of counterplans is somewhat checkered. The potential for increasing adjusted value added by reducing materials and other costs remain underutilized. Every year a limited number of enterprises propose outputs in excess of prescribed targets linked to requests for increasing wages payable resources. These additional outputs remain on the whole insignificant, however. Moreover, there is a general lack of compliance with the principle of reducing the basic component of wages upon the failure to approve established targets for adjusted value added. Every year during the compilation of draft plans targets specified in the state plan breakdown are not adopted in numerous enterprises for a number of indicators.

This occurs despite the fact that at a later stage, namely during the formulation of implementation plans at the beginning of the following year, these targets are in fact adopted. This is a paradoxical situation in which over a period of 6-8 months the enterprise sphere absorbs and assures tasks which it originally deemed to be unrealistic. For instance, in formulating plan drafts for 1985 about 25 percent of all enterprises in centrally managed industry on the territory of the CSR operated with counterplans. Contributions to the adjusted value added indicator were about Kcs 0.7 billion over plan projections. The remaining enterprises, however refused to include more than Kcs 7.5 billion into their draft plans. The targets of the state plan after its publication in November of last year were just as rigorous as during its draft phase, but the enterprise sphere nevertheless is meeting these targets in their implementation plans for 1985. In the past 4 years the tasks established by the state plan and adopted in economic implementation plans (with the exception of the first year of the 5-year plan) have even been overfulfilled (see Table 2).

Table 2. Task Fulfillment for the State Plan in the CSR (in percent)

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
Outputs	99.6	100.8	102.1	102.2
Adjusted value added	99.7	102.2	103.3	103.3
Profits	99.9	107.0	108.8	109.2

Deceptive Structure

The Seventh 5-Year Plan saw the first application of a system of across the board adjustments in wholesale prices. This complicates to some extent analytical possibilities and comparisons of developments over the long term. The data which the bank does have available indicates that in the initial 4 years of the 5-year plan profits rose more rapidly (by 31.5 percent in 1984 in comparison with 1980) than adjusted value added (14.8 percent), which in turn rose more rapidly than outputs (7.3 percent). Wage costs increased by 8.1 percent, while material and other costs (excluding depreciation) increased at the slowest pace (2.9 percent). These data were obtained as the result of chain indexes of growth in the cited indicators.

Wage costs, which should increase more slowly than outputs, are the only costs which do not correspond to the desirable ranking of growth rate standards. It is, however, interesting that the internal structure of adjusted value added has evolved in accordance with this requirement, in the sense that wage costs as a percentage of total costs have declined (from 44.39 percent in 1980 to 40.28 percent in 1984.).

In all 4 years of the 5-year plan the structure of adjusted value added has been better than projected by the state plan. Individual cost categories as percentages of adjusted value added were lower in all individual years, while the percentage of profit rose by the largest amount. At the same time the increase in profits was so significant that even though the wage cost increases were out of line (they increased faster than outputs) the adjusted value added indicator absorbed their increases, meaning that by itself it would not signal any disruption in desired rankings.

In theoretical discussions the argument is often made that adjusted value added can increase through an undesirable and excessive increase in wage costs. Nevertheless it does lead to significant deviations, not only in evaluating development in the form of growth rate standards, but also in making comparisons with the state plan. According to data in the appendix to CSR Government Resolution No 128 from May 1982 that pertained to the state plan for national economic development for 1981-1985 wage costs were to increase by 0.8 percent between 1982 and 1985. In reality by 1984 there had already been much higher increases (4.3).

The foregoing information indicates that:

--after the introduction of the adjusted value added indicator the material intensiveness of production began to decline. The technique of counterplanning,

however, has so far not been utilized to the fullest to further reduce this intensiveness. Efforts on the part of the enterprise managerial sphere to make contributions through internally formulated, implemented and monitored measures have not been very effective. In the past 2 years particularly the increased pace of output has been exerting a more significant influence, with a consequent rise in fixed costs;

--by itself the adjusted value added indicator is not a good predictor concerning desired proportions. It is necessary, therefore to monitor developments in a broader context and from more points of view in order better to evaluate the degree of developmental efficiency.

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CZECHOSLOVAKIA

INCREASING ENERGY CONSUMPTION CRITICIZED

Prague HOSPODARSKE NOVINY in Czech No 39, 1985 p 3

[Article by Eng Miroslav Farsky and Eng Pavel Pesek, Candidate for Doctor of Science, Czechoslovak Academy of Sciences Economic Institute, Usti nad Labem branch: "Fuel and Power Resources: The Sole Way to Move Forward is Through Intensification"]

[Text] In the past the Czechoslovak economy has been characterized by rapid growth in the physical volume of primary power resource inputs, a trend which began to slack off only in the early 1980s. Only electric power consumption continues to show a tendency to increase. What should be our strategy in terms of intensifying the capital replacement process? This article addresses one of the alternatives.

In the early 1980s there were two important changes in the resource structure of the fuel and power balance:

--Crude oil imports from the USSR, after peaking in 1980, began to decline with the result that we currently must get by with about 87 percent of the above maximum. Increased brown coal extraction has played the major role in compensating for decreased crude oil deliveries (with average annual increases of 2.4 percent between 1980 and 1984), along with increased imports of Soviet natural gas (5.8 percent average annual increases during the same period). There has been an absolute decline in the consumption of petroleum distillates both for power generation purposes (mazut) and for motor applications (gasoline and diesel fuel). This reduction was achieved both through direct regulation in the form of specific consumption constraints, and indirectly in the form of measures adopted in wholesale and retail pricing;

--a Czechoslovak nuclear electric power generation capacity is being developed, which now accounts for more than 9 percent of total electricity generated. Along with this a strategy has been settled upon for the growth rate of the Czechoslovak nuclear power sector which will result in a substantial structural shift in our fuel and power complex.

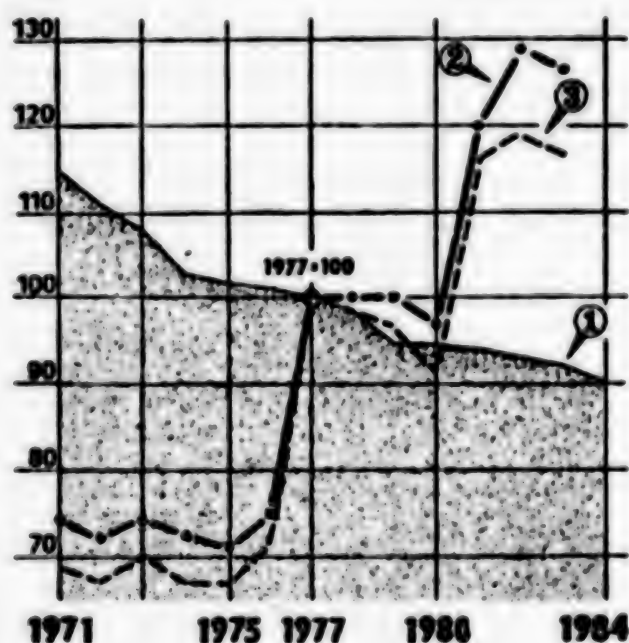
The increased importance of domestic power generation resources is also becoming evident, quite logically, in increased pressure for the allocation of investment and capital construction resources to the fuel and power sector.

While in 1980 Kcs 17.7 billion were invested in the sector controlled by the Federal Ministry of Fuel and Power (29.7 percent of all industrial investment), in 1984 the figure was Kcs 20.3 billion (34.1 percent of total investment in industry). Moreover, the details of this investment program (for instance, long construction times) are such that neither a levelling off or moderate decline in brown coal extraction nor a slowdown in the pace of nuclear power plant construction would cause a significant decline in the volume of investment resources being directed to these sectors through the year 2000. Such a slowdown would have a significant impact at a later date, however. For that matter, though, any real restrictions on overall investment volume will have a restrictive impact in the future on all other industrial sectors.

Energy Intensiveness

Recent analyses of national economic performance have devoted attention to the physical energy intensiveness of the national income (or social product) indicator, the performance of which in the 1971-1984 period is shown on the graph on the following page. The long term declining trend of this indicator represents a desirable and objective trend in the development of the forces of production.

Table 1. Energy Intensiveness of National Income Formation (1977=100)



Key:

1. consumption of primary power resources in physical units (joules) per unit of formed national income in constant 1977 prices.
2. costs of consumed power resources in current prices per unit of formed national income valued at constant 1977 prices.
3. costs of consumed power resources in current prices per unit of formed national income valued at current prices

Sources: calculations by the authors

A number of international comparisons (albeit not methodologically identical) indicate that the absolute level of this indicator in our country is still some 30-50 percent higher than in most industrially advanced countries.

The energy cost intensiveness of national income formation is an indicator that is just as important for the planning and management of the capital replacement process, even though it is often overlooked. Over the 1971-1984 period this indicator (also on the graph above) has shown two sharp increases: the first between 1976 and 1977 in conjunction with the nationwide restructuring of wholesale prices, and the second between 1980 and 1981 in conjunction with the so-called rationalization of the wholesale prices of fuel and power related commodities. This shows that the decline in energy intensiveness in physical units has so far far from offset increased energy prices, and in the final analysis the labor costs for obtaining it.

The necessity for a concurrent and complementary evaluation of the physical and the cost expressions of energy intensiveness of production is especially critical at the micro level, and primarily when evaluating state priority program 02 (fuel and power conservation). This program has set itself the goal of reducing the relative consumption of primary energy resources in national income formation. The indicator defined macroeconomically in this way is then, however, further broken down at the sectoral and economic production unit [VHJ] level not in relation to constant prices and assigned value, as would be methodologically proper, but in relation to the volume of production in current prices. Moreover, in accordance with guideline No 17/1981 of the former federal ministry for technical and investment development, the evaluation of specific rationalization objectives is being conducted using corrected wholesale prices for fuel and power (with the help of the so-called limitation coefficient, a_2). Such criteria, however, do not help in evaluating past performance, because this is done by using entirely *khozraschot* considerations and current prices. The frequent result is an oversimplified conclusion concerning the inefficiency of a given program.

The main problem in evaluating the degree of fuel conservation within the context of state priority program 02 is that the measurement of energy consumption at any level lower than an enterprise or a plant (with the exception of electricity usage) is usually for practical purposes next to impossible because of a shortage of measurement equipment. This means that physical savings under this program are rarely demonstrated. In other words we are often dealing with what are rather hypothetical savings. (we refer readers of *HOSPODARSKE NOVINY* to the article, *Perpetuum Mobile of Conservation*, written by Dagmar Cerna in No 47/1984 and the responses published in No 13/1985, which particularly caught our eye).

A further methodological problem of the current approach to evaluating fuel and power conservation (although the same applies to metals) is the issue of defining and evaluating the full energy intensiveness of their substitutes. Because the interest of sectors lies in evaluating only the direct energy intensiveness of savings gained by substituting one raw material for another (e.g. plastics for metals) within a single sector, on many occasions the overall national economic consequences of such substitutions are not nearly as

favorable. This is further complicated by a methodological peculiarity of Czechoslovak statistics, namely that crude oil and crude oil produce consumption in the chemical industry does not appear as fuel and power consumption in a number of statistical reports.

The Impact of Constraints and Prices

We were able to deal with the tightening in the material balance of fuel and power resources that occurred in the early 1980s primarily because of reduced crude oil deliveries and the delayed startup of nuclear generating facilities by establishing physical limits on consumption and sharply increasing the prices of petroleum products.

Physical limits on production sphere consumption served us well and in our opinion represent an important management tool. Their major drawback is that they are established for the most part administratively (through index numbers). In practice they are utilized only at the level of the annual plan. They should be derived as much as possible from international comparisons made at the level of divisions and subdivisions, and incorporated into medium term plans. This would make it possible to restrict stochastic distortions that are caused by short term climatic and seasonal influences.

The impact of climate, which in our geographic zones may influence primary energy consumption by as much as 1-2 percent annually, is frequently underestimated. As Eng Vaclav Vertelar wrote in his article Precondition for Speeding up Intensification in *Hospodarske Noviny* No 22/1985, "As the past winter showed our achievements of recent years in fuel and power conservation reflect more "the grace of the weather" than any real or permanent measures to reduce the high energy intensiveness of our production."

Physical limits were only partly successful in regulating consumption in the non-production sphere, mainly because applying them mechanically is frequently undesirable in terms of increasing the standard of living.

Beginning with the restructuring of wholesale prices of 1977 and the annual implementation of these prices beginning in 1980, production enterprises were faced with the task of gradually coming to grips with increasing costs for fuel and power, both domestic and imported. We have not been successful in moderating this influence in the *khozraschot* sphere. Detailed analyses have shown, on the contrary, that increases in fuel and power prices have not forced existing facilities, where the greatest inertia lies, to improve conservation programs for energy, but rather have tended to push production costs up. Higher fuel and power prices should in the future provide advantages to those investments and innovations which are directed at the exploitation of secondary and nontraditional energy resources and at increasing the efficiency of energy consumption.

Studies on the further development of prices for fuel and power related commodities frequently note that current Czechoslovak wholesale prices continue to be characterized by significant deviations from their socially necessary costs, which is significant in the following contexts:

--the resources generated by VNH under the Federal Ministry of Fuel and Power (profits and depreciation) are adequate only to cover current capital investment requirements;

--the costs of the sector administered by the Federal Ministry of Fuel and Power do not reflect all the investments related to the development of domestic extraction. Furthermore the economic performance of this sector is not affected by the costs incurred in the compensation for and prevention of ecological damage in agriculture and forestry, and the maintenance of public health;

--the wholesale prices of crude oil for petrochemical uses do not include the actual import costs (all charges paid costs); as a result the prices of petrochemical products are out of line with their socially necessary costs.

Currently our economic research establishment, and especially researchers at the Research Institute of the Fuel and Power Complex and at the CSAV Economic Institute have formulated research projects designed both to further define the methodology for calculating the full socially necessary costs for obtaining fuel and power resources and to make more precise the numbers representing current qualified estimates. It is anticipated that this research will provide an improved foundation for the evaluation in national economic terms of the effectiveness of investment and innovative programs designed to have a significant impact on the fuel and power balance.

International comparisons show that the price relationships between fuel and power resources and the other factors in production in Czechoslovakia are gradually coming into line with similar relationships in other advanced industrial economies. This allows analyses to focus greater attention on considerations such as the sophistication of problem solving, energy consumption during materials handling and in transportation, the level of organization of production management and the quality of production. One can anticipate increased differences between the material impact (on physical balances) of innovations designed to conserve energy resources and their impact on costs. For instance, currently physical savings of petroleum products are accompanied by cost savings, because this is clearly a very expensive, very costly commodity. This need not be the case, however, in the future substitution of natural gas or electricity generated by nuclear plants for coal, which would more than likely increase costs per physical unit of the resource.

While currently innovative activity is directed at physical savings of energy resources in the future it will be a question rather of obtaining greater value added from each consumed unit of energy resource.

International Comparisons

The reality of high standard consumption of primary energy resources in Czechoslovakia is usually accounted for by the high share of solid fuels in our fuel and power balance at least in comparison with most industrially advanced countries.

Using statistics from the United Nations we have compared the energy efficiency of the Czechoslovak fuel and power complex with 10 selected fuel and power complexes of the industrially advanced countries of Europe, and of the USA. Efficiency has been defined as the ratio between the power resources generated by the individual fuel and power complexes and the primary resources, both imported and domestic, that are used to generate these outputs. Although we discovered significant differences between the countries being compared in the structure of inputs and outputs it may be stated that in these terms the situation of the Czechoslovak fuel and power complex is not that bad. For instance, if we were to assign the number 100 to the efficiency of the Czechoslovak fuel and power complex in 1981, then Belgium would outperform us only by 7 points, Austria by 6 points and the Netherlands by 8 points. Yugoslavia would have underperformed us by 8 points and the GDR by 7 points.

Even treating these figures as points of reference only, in our opinion they justify the conclusion that exploiting underutilized capacities to increase the internal efficiency of Czechoslovak fuel and power management cannot alone eliminate the so-called barriers to power generation. This is the more so because exploiting reserves of this type (such as the reconstruction of obsolete boilers elsewhere than in the sector administered by the FMPE) requires the allocation of significant investment resources.

It is our opinion that at the national economic level the most important consideration is the level and structure of the consumption of the outputs of a given national fuel and power complex. We call this energy resource utilization in a national economy. In this regard a comparison with other industrially advanced countries showed the following:

--that Czechoslovak industry accounts for a higher percentage of total consumption than in many other countries;

--transportation and personal consumption accounts for a smaller percentage than elsewhere of total energy resource utilization;

--a substantially lower yield in Czechoslovakia of net production per physical unit of consumed energy resource.

An awareness of these differences should make it possible to develop systemic measures intended to reduce the energy intensiveness of our economy, with attention focused on reducing energy consumption in industry. This involves an entire complex of measures from reducing the volume of production of large energy intensive products to technological innovation, and greater efficiency in adding value to imported raw materials and materials and to exported products.

It is our view that under the current conditions of the shift to an intensive type of economic management the development of the Czechoslovak fuel and power complex has long since ceased to be the concern solely of the FMPE, but rather has become involved in the entire capital replacement process of our economy and its integration into the international division of labor.

We contend that projections of the further development of consumption of primary energy resources should be of a normative - valuational type, with the possible volume of energy consumption considered to be an exogenously determined limit to which the Czechoslovak economy must technically and managerially adapt. The factors motivating further increases in energy consumption will primarily be the need to satisfy demand stemming from either population growth or an improved standard of living. It is also necessary to satisfy growing energy consumption requirements for transportation that are the result of expanding international division of labor.

On the other hand international comparisons of the level of energy consumption and energy intensiveness in industry and construction suggest a need to reduce energy consumption. For both ecological and technical reasons we must consider a moderate reduction in the extraction of brown coal.

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GERMAN DEMOCRATIC REPUBLIC

BIOTECHNOLOGY: POTENTIAL EFFECT ON NATIONAL ECONOMY VIEWED

Resource Allocation Advised

East Berlin WIRTSCHAFTSWISSENSCHAFT in German Vol 33 No 7, Jul 85 pp 1009-1023

[Article by Dr Peter Handke, certified agronomist, director for the research group at the GDR Academy of Sciences Institute for Theory, History and Organization of Science: "Modern Biotechnology on Its Way to a Basic Innovation."]

[Text] Modern biotechnology with its basic processes such as gene, enzyme and cell technologies, tissue culture and high capacity fermentation is one of the scientific-technological trends that are apt to have a decisive influence on the shaping of a new national economic level of productivity and effectiveness and on sharpening the image of the system of the productive forces. It comprises a variety of processes and applications with a far-reaching sphere of action, and it requires extensive complex and timely advance services by many branches of the economy and social spheres. Biotechnology is characterized by various interlocking relations in the reproduction process and stands out for its high science intensity and the particularly close connection of science and production. This makes it necessary, inter alia, to carry out strategic investigations to see innovative potentials in time, to concentrate forces appropriately and in the main economic directions, and to acquire effectiveness potentials and the necessary conditions of development so as to use biotechnology efficiently and in accordance with the economic strategy of the GDR.

"Corresponding to the state of our economy, productivity increase is more and more derived from scientific-technological advances, primarily the entry of modern technologies into production,"¹ affirmed Erick Honecker at the Ninth Session of the Central Committee of the SED [Socialist Unity Party of Germany] and he also urged that "the possibilities of the scientific-technological revolution with all their consequences should be made accessible for the advancement of the productive forces.... How we respond to this imperative necessity, will decide the future of the GDR as a modern industrialized country with well-developed agriculture and strong positions at the international markets."² Realization of the economic strategy also requires an acceleration of work in the "area of biotechnology with future promises"³ and in exploiting

its results. Biotechnology is among the basic scientific-technological developments imputed to have great significance in the development of a new level of national-economic productivity and effectiveness.⁴

Biotechnology—a Diverse, Complex and Very Promising Field of Innovation

Biotechnological research and development is on a noteworthy upswing internationally. Numerous national and international programs and an increasingly more frequent series of scientific-technological congresses are arranged for the advancement of biotechnology and the industrial utilization of its results. Biotechnological industries are being developed and specific new operations are established. New, far-reaching hopes are awakened by the results so far and by the very promising prospects made possible through advances in knowledge. Nevertheless, also in this developing field of innovations, the hopes are not without sobering considerations not solely because of the possible dangers from altered biological objects and systems but above all because initial results are not easy to achieve and they require great effort and preparatory work often of national economic importance.

Modern biotechnology is made possible through decisive breakthroughs in molecular and cell biology, biochemistry, technical chemistry, microbiology, methodology and many other scientific disciplines; but even the industrial utilization of the new principles and techniques itself is also connected with an extraordinarily high input from basic and applied research. A new level of intensive integration of science and production is being formed.

Biotechnology provides the basis for the industrial or technical utilization of biological organisms, agents and processes for getting certain products or results. Firstly, it is based on a large number of basic or emerging scientific disciplines or knowledge complexes; secondly, it encompasses a large number of biotechnical methods which, thirdly, are applied or can be applied in various and widely branched areas of utilization.

These three fields are not directly and simply connected with each other; there are abundantly interwoven developmental complexes or lines which exhibit specific raw material-procedure-product-entanglements, directions of activity and interdisciplinary correlations from time to time. Specific combinations of advances in basic knowledge lead to gene technology, enzyme technology, microbial fermentation, occasionally connected in a special manner with the growth in knowledge involving engineering science and economics.

The actual and very promising significance of biotechnology is derived from the enrichment of its traditional methods through new types of procedures with possibilities for high productivity. Roughly three developmental phases can be distinguished here:

1. purely empirical utilization of biological principles and processes (for example various fermentations) predominant for historically long times;
2. the subsequent scientific breakthrough and establishment of this method, and the thereby enforced rationalization, effectualization and expansion (for example ethanol production, the utilization of microbial metabolic products);

3. the most recent modern procedural developments such as gene, enzyme and cell technology, tissue culture, high-productivity microbial fermentation which have and will only become possible through scientific insights into molecular, cell and microbiology, process technology and others (modern biotechnology).

Thus biotechnology represents a multi-layered field of innovations encompassing various developmental trends, conditional adaptations and directions of effectiveness and requiring specific strategic examinations and specific measures for furtherance from time to time (see figure 1). The many-sided possibilities of application, of enzyme technology alone, in food production reveal only a small segment of the spectrum of biotechnological applications whereby the individual trends in usage are further differentiated in terms of scope and effects (see figure 2).

The connection between advances in scientific knowledge and situations involving economic need is shown as an essential condition for innovations both in the generation and industrial usage of new technological developments. This is expressed, on the one hand, through a technologically useful solution of problems such as gene technological changes in organisms, enzyme production and application, microbial production of biomasses, biosynthesis with immobilized enzymes and cells, hybridoma-cell and tissue cultures; on the other hand, the search for new sources of raw material, technologies and more effective solutions--demanded by the scarcity in raw materials and energy as a result of extensive exhaustion of the production potential of previous technologies⁵--and such global problems as securing nutrition for an increasing number of people, protecting the environment from larger stresses, or health care, are conferring high importance on biotechnology. Moreover, advances in knowledge and the technically achievable solutions connected with them are awakening new needs for utilization, for example new diagnostic and therapeutic inroads in medicine through the hybridoma technique and drugs produced using modern biotechnology.

The readiness to innovate is additionally influenced by the extent to which a newly developed process had been tried out and had proven itself to be functional, by its suitability for integration with existing production structures and outlets, by the ability of the economy to make the transition and its power of accumulation, and particularly, of course, by the prospects of effectiveness. Scientific-technological possibilities and economic requirements, and also purposefulness are working together. A relatively high risk, based on the degree of novelty and the associated problems in development, requires meanwhile a readiness to proceed resolutely in order to meet the time factor and to reach "exceptional productive strength."

Greater and greater scientific advances in the various directions of modern biotechnology are becoming known the world over. In their economic evaluation, at the present time, particularly the directions of usefulness are foremost; these encompass, for instance, special drugs and fine chemicals and also enzymes to be used for various purposes. Among the few already achieved applications with broad national economic impact are the production of single cell protein in the USSR (fodder), fructose syrup from cornstarch in the USA (sugar substitute) and gasohol in Brazil (fuel). In contrast, tasks of high expectations such as cellulose-hemicellulose-lignin splitting, nitrogen fixation,

Basic biotechniques
Gene technique Enzyme technique Cell technique including immune technique Tissue culture Microbial fermentation

Biotechniques for utilization of certain biological functions and results	Areas of application
Microbiological production of material masses	Industry (pharmaceutical, chemical, food industries, metal and crude oil production)
Biotechnical transformation of materials	Agriculture
Manufacture of primary and secondary metabolic products (antibiotics, hormones, amino acids...)	Energetics
Binding/concentration of certain substances through living things (metal leaching, N-fixation)	Environmental protection and recultivation of fallow land
Microbial decomposition of materials (waste water and refuse processing)	Health system
Use of photosynthetically regenerable energy sources (bioenergy)	
Algae cultures (for fodder and nutrition)	
Embryo- and cell genetic methods for animal selection and reproduction	

Figure 1. Biotechnological methods and areas of application

Enzyme	Industrial branch	Food-technological importance
Protease	Baked goods industry	Weakening the gluten in flours; softening doughs
	Brewery	Improved splitting of raw fruit to increase the alpha-amino nitrogen content in the malt; cold-stabilization of beer
	Cheese production	Replacing calf rennet in cheese production
	Meat industry	Tenderizing beef; removing meat from bones; separating fats and oil from the animal material
	Fish processing industry	Tenderizing fish
	Processed food industry	Producing protein hydrolysates for spices, soups, sauces and also for special forms of diet
Alpha-amylase	Baked goods industry	Improving the aw content of flours
	Brewery	Splitting raw fruit to make available fermentable sugars
	Starch processing industry	Preparing starch syrups
	Distillery	Decomposition of potato and grain starches
Glucoamylase	Starch processing industry	Producing grape sugar
	Brewery	Producing beer for diabetics
	Distillery	Decomposing limit dextrins in splitting starches and thereby increasing the alcohol yield
Glucanase	Brewery	Splitting of barley glucan when raw fruit is added
Invertase	Sweet and preserved baked goods industry	Producing artificial honey and "liqueur sugar"; producing soft creme fillings from liquid chocolate and praline fillers; keeping soft fondant masses, marzipan and persipan
Pectinolytic enzymes	Fruit and vegetable processing industry	Increasing the yield of fruit and vegetable juices; clearing fruit juices; producing fruit and vegetable pulps, hydrolysates (together with cellulase) and powders
	Wine industry	Increasing the juice yield and improved clearing
	Processed food industry	Producing fast-cooking legumes

Lactase	Dairy industry	Stabilizing cold-storage milk concentrates; producing milk for patients with lactose intolerance
	Ice cream production	Preventing crystallization of the milk sugar
	Whey utilization	Splitting milk sugar
Glucose- oxydase (in association with catalase)		Removing glucose from various foods to prevent the Maillard reaction (for example in powdered egg production); removing oxygen from drinks
Lipase	Dairy industry	Giving aroma to cheese

Figure 2. Current and foreseeable use of enzymes in food production⁶

gene-technological modification of the productivity of higher plants and animals and the microbial utilization of wastes and byproducts still considered difficult to decompose at present, are still in part controversial with respect to the prospects of their resolution and still require extensive, often costly basic research.

Significant effects might be expected in the future from biotechnology, over what can already be realized today. At present, we are obviously at the beginning of a broad field of innovations. At the same time, advanced industrial countries are already manufacturing a large part of their industrial products or gross products with the help of biotechnology. There are indications for extensive developments, ranging to the establishment of a new combination of productive forces. Long-range developments are mentioned as examples of the influence of biotechnology on creating chemical products:⁷

Petro- chemistry	carbon	biotechnologically influenced	biotechnologically
	chemistry	chemistry with extensive	determined lines of
		use of the current production and technological structure	procedure and product structure in the chemical industry

Such prognosticated developmental prospects or even sequence of steps require many thorough investigations; some foreseeable sections overlap and do not merely follow each other precisely. Nevertheless, they point to the appearance of new sides of societal effectiveness, becoming more important in a stepwise manner, a process of change which, in addition to its effects on the branches and on the national economy, also encompasses other areas of society. Should

it succeed during the next two or three decades, for instance, in achieving clearly expanded nitrogen fixation by soil bacteria, symbiotic systems or higher plants, and making the thus produced nitrogen available at a time favorable to an increase of the yield of the plants, then the effects would also involve chemical fertilizer production, fertilizer transport and its application. In this developmental process which foreshadows itself through a few indications, increasingly more complex solutions, for example, will also appear transcending the borders between chemical and biotechnological production, between agriculture, and microbial industry and the removal of wastes. Thereby the process of change will also be determined by how the relations among the various developmental directions develop (see figure 3).

In the current view, the highest effectiveness is to be reached not through certain favorite alternatives but through a flexible combination of the possibilities. It will also lead to an increased ability and readiness to react which is gaining increasingly greater importance. A country such as the GDR is not able to cooperate in the forefront at all points of biotechnological growth. This provides, among others, the objective need both for high readiness on the part of research and the economy to react to novel, effective directions, and for intensive cooperation in the framework of CEMA.

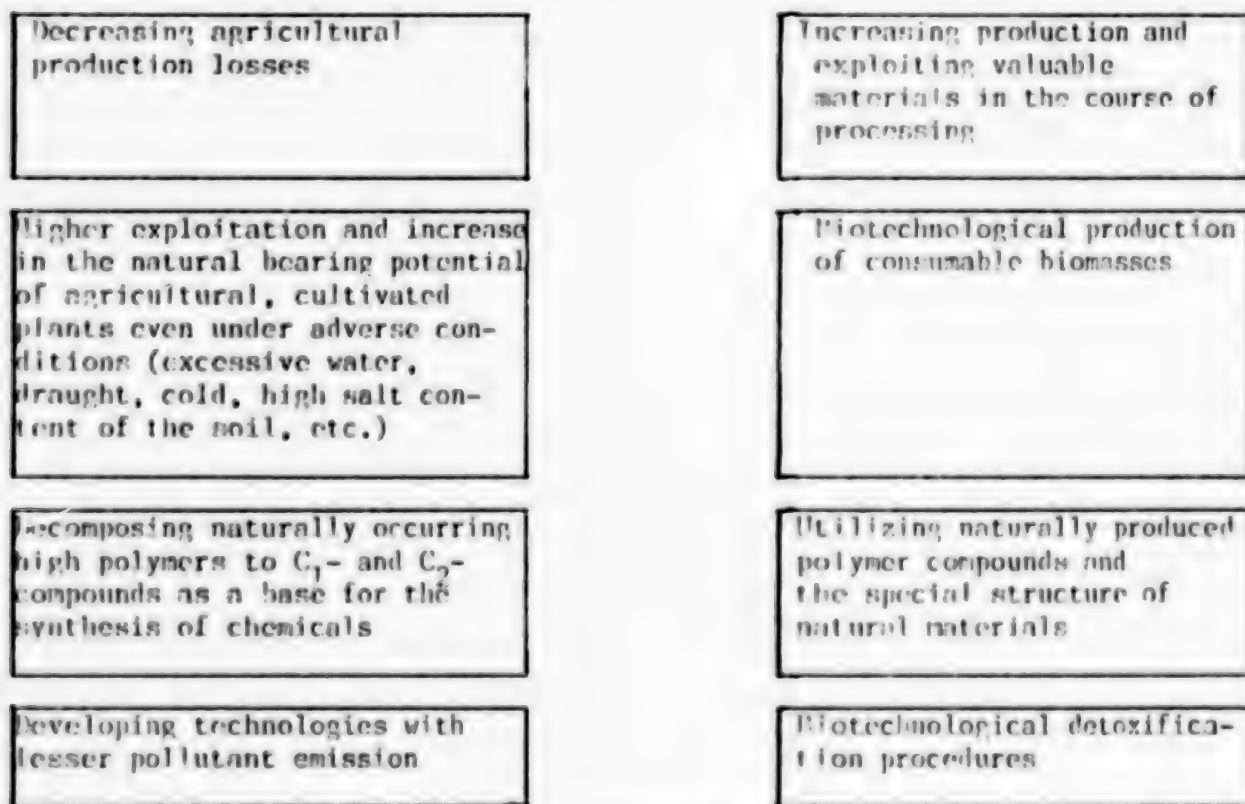


Figure 3. Possible roads of advancement using biotechnological procedures⁹

On the one hand, the individual procedures such as gene, enzyme and cell technology, tissue culture and fermentation consist of specific conditions for and effects on development which are coupled with different scientific-technological and also economic suppositions, requirements and possibilities of usage, and consequences. On the other hand, some general strengths can also be summarized:

rendering accessible sources of raw material not used or little used before, complete utilization of raw material sources already profitably used and, especially, profitable use of renewable sources of raw material,

rationalization, effectivization and modernization of technologies (features of procedures in production),

acquisition and profitable use of new types of and perfected products,

shaping and changing the production and technological structures in factories, industrial combinations, and branches of the national economy to increase effectiveness.

In addition to the traditional biotechnological procedures (for example in the food and beverage industries), there is intensive work in the research and industry of the GDR involving the search for new strengths, and the development and setting up of new procedures. Some examples, among others, are the production of single cell protein based on crude oil distillates ("Fermosin"), developed jointly with the USSR, the efforts directed at the biotechnological production of drugs or the use of enzymes in the food industry and also a number of gene-technological projects. Thus, the following are among products of biotechnology: fodder yeast, antibiotics and other active compounds, enzymes and organic acids.

Three problem complexes of strategic investigations were found to be particularly important for acquiring promising biotechnological innovations:

recognizing early the research advances relevant to innovation,

establishing the potential effectiveness of innovations,

working out conditions and requirements for the industrial utilization of biotechnological procedures.

Early Recognition of Innovative Potencies and Timely Concentration of Forces

The importance of an early recognition of research problems and achievements which decisively contribute to the progress in knowledge and lead to expected innovations can only be overestimated. Progressive scientists and production collectives are making a continuous effort to be among the first in new research trends and industrial developments. This concern carries particular weight in modern biotechnology. For one, only through timely co-determination of international trends of development is it possible to reach "exceptional strength of productivity" and dynamic effectiveness. For another, the broad and specific

complex hypotheses needed for biotechnology require early, strategy-oriented inquiries in order to comprehend the calculable risks and to invest the available resources in the most promising manner.

But the early recognition of promising new problems and innovative solutions is obviously difficult and it is closely related to the immediate research process. The degree of success is greatly influenced by how effectively the leading researchers and research directors, natural, technological and social scientists cooperate with each other and let their readiness to absorb and strategically cultivate new problems and developments become effective. They also carry a very great social responsibility for evaluating new, promising problem solutions in a decision-relevant manner since they possess, in the initial development, the broadest knowledge for estimating the significance of new developments.

The early recognition of more important advances in knowledge must also lead to decisions about the adequacy of the application and realization of potentials in the interest of a joint determination of the international level of research and the unlocking of innovative capabilities.⁹ The great role played by the time factor, in certain cases, requires a concentration of the potential already way before any significant problems and their solutions are recognized and generally acknowledged. Subsequent developments usually require the same high expenditures but do not lead to the same potential effectiveness as initial innovations.

In order to make the transition as short as possible from problematic ideas, potentially promising new types of hypotheses and the possibilities for solving them to a concentrated deployment of forces for their elucidation, in order to facilitate the early recognition relevant to the decision making, some of the tested management measures and orientations are particularly significant:

a) Strategy oriented investigations, carried out not predominantly as by-products of the management process or through groups hastily assembled for this purpose but rather as an independent work area and closely associated with the on-going research process, are of great importance for perceiving and examining new types of problems, for making statements about the prospects of solution, possibilities of effectiveness, conditions for development and about eventual variants for the investigation of new problem formulations, and for establishing the basis for decisions and their early implementation.

b) A broad problem-solving potential in the field of basic research provides a basis for having possibilities for making choices and for being able to respond to new international trends rapidly. It seems important that, in the GDR, the outstanding basic biotechnical innovations such as gene, enzyme, cell techniques and large-scale fermentation should be worked up in a concentrated manner and, taking into consideration the specific requirements and possibilities in the GDR, should subsequently be made useful and also should be applied in raw material preparation and product manufacturing.

c) The extent and complexity of the biotechnological research and innovation hypotheses, and the mutual dependence on research advances and industrial

development make it necessary that research and innovation strategies be brought together in anticipation of decisions about a step-by-step transition from research and innovation prospects to decisions about approved research and economic development. Since biotechnological investigations and developments require, on the one hand, very valuable instruments and chemicals and also well-founded prospects for industrial development in order to justify and later also recover the high research expenditures, the necessary investment decisions of industry, on the other hand, require, among other things, adequately justified solution prospects, potentials of effectiveness and also risk estimates for innovative research directions.

d) Close international cooperation among the socialist countries, encompassing the entire field of biotechnological innovations, is required in view of the fast rate of development and sufficient breadth of problems, possibilities for concentrating strengths in the decisive biotechnological directions and in the preliminary efforts required by them. As pointed out at the Ninth Meeting of the Central Committee of the SED, the close scientific cooperation with the USSR and the other socialist countries provides good possibilities for a considerable increase in the pace of both the investigation and utilization of biotechnological procedures.¹⁰

Determination of the Effectiveness Potential

It is very important to have knowledge concerning the effectiveness potential of innovations when decisions are made about research orientations and innovations when decisions are made about research is available precisely when such decisions must be made. New potentialities are only recognized step by step, they develop gradually. The spectrum of influencing factors undergoes a change.

The innovation field of biotechnology, just like most of the modern biotechnological procedures, is in the beginning phases of innovative development. The various trends have reached a different stage of development. Advances in knowledge and procedures are to a large part determined by research methodological routes, and they need not coincide, from the start, with the fields of application to be reached in the future for the greatest economic effect.

The evaluation of biotechnological results must satisfy very diverse criteria according to the field of application of the biotechnological procedures such as agriculture, food industry, pharmaceutical industry, waste material conversion, and according to the area of usage or functional effect of the products or procedure, for instance in the health care system, in the feeding of animals, in environmental protection and in human nutrition. Current criteria for properties having utility value will be expanded, made relative and also, in part, replaced through new aspects evolving in the course of innovative development. Scientific and technological data must be transformed into economical ones. Resultant social effects often cannot yet be recognized or are not yet pronounced. Expected developmental correlations between the biotechnological procedures and diverse complexes of need or various economic branches are still to be examined. What is recognizable or is unexpected, what is possible or impossible to plan, what is desirable or undesirable are, therefore, interconnected and they influence the element of risk contained in

strategic decisions. In order to provide an overview of the risk element and to demonstrate effectiveness potencies and conditions of development, new technologies and products must be analyzed not only in terms of process economy but, additionally, the conditions for integration into the reproduction process of society must be ascertained. Hence answers are important to questions such as:

the scientific-technical and economic productivity of the new procedure, its cost-utility relationship and reliability, advantages and disadvantages compared with hitherto used procedures, international state of the field of innovation, the real, available and accessible resources and potentialities of the GDR, developmental capacity of the production profile achieved, adaptation requirements, possible stages in the time course of realization, difficulties and risks connected with the initial innovation, contributions made by the innovation to political, economic and social goals, possible consequences of omitted or untimely innovation.¹¹

With the scientific-technological advancement, economic valuations also change regarding the prospects of effectiveness. Thus, for example, in fermentation technology, a series of innovations occur:¹²

Batch process	Continuous/semicontinuous process management
Cells in suspension	Immobilized cells
Low fermentation temperatures	Higher fermentation temperatures
Low substrate and product concentrations	Higher substrate and product concentrations
One-time use of cells	Cell recycling or reuse of cells
Natural strains	Improved or manipulated strains
Distillation	Fluid-fluid extraction, membranes, absorbents, improved distillation
Indirect product sensors	Direct product sensors
Simple guidance	Computer assisted guidance

Of course, every biotechnological innovation must be compared economically with previous production methods. There is also motivation to make still expensive procedures more economical. But biotechnology also makes possible the production of materials (for example through gene-technologically altered micro-organisms) which cannot be produced otherwise or which are produced only by the human body, by animals or by higher plants and are difficult to isolate from there or can be isolated in insufficient amounts, such as growth hormones, interferon or other active materials. And when, in the more distant future, fossil carbohydrates will become scarce, renewable carbon sources and the biotechnology built on them will offer ways to obtaining products and energy

otherwise produced through chemistry. Additionally, when the currently established technologies have a detrimental effect on natural potentials and cause irreversible environmental changes injurious to human development, biotechnological procedures might be given preference to the extent that they have a protective effect on the biosphere. Thus, gradually, new types of economic valuations are created. They develop along with the innovation processes and they extend, according to the capabilities of the new procedures, to further social development and to affect the establishment and satisfaction of social needs, also to the economy.

Pretentious Demands, Conditions for Development

Conditions for industrialization are strongly determined, first of all, by the required procedural steps and their relationships. In principle, biotechnological procedures feature a characteristic sequence of steps:

1. acquisition of raw materials and preparation (purchase, transport, discovery and preliminary treatment);
2. construction, multiplication and continuous reproduction of a microbial production strain or of a higher organism, or exploitation of the biological agents;
3. preparation of the fermentation medium, sterilization, sterile handling, fermentation;
4. obtaining and purifying the product;
5. elimination of by-products.

The effectiveness of biotechnological innovations is always influenced by the specific combination of raw materials, procedure and use of the product. A decisive role is played by the availability of, continuous access to, and transport and quality of the raw materials just as by the conditions and steps of the procedure and also by usage habits and possibilities. While potential advantages of fermentation processes may be pointed out, such as the use of renewable raw materials and previously unused wastes, mild reaction conditions (not as high temperatures and pressures as in chemical processes, lower energy intensity), one-step production methods (compared with the often many steps of chemical conversion and syntheses), high selectivity of the processes and reduced contamination of the environment, there may be contrasting production conditions which often require considerable expenditure and biotechnological procedures are still often more costly than the chemical processes. The required organisms must be selected and grown, and biological agents must be produced; high water use is required; sterilization and sterile conditions often require great effort; product separation and purification take place under complex conditions usually requiring much energy; high concentrations of the products inhibit the fermentation process; biotechnical production also produces wastes of which the storage, conversion or removal is costly. In the case of active substance production, widespread medical testing is still necessary. These provide a specific spectrum of demands on the conditions for industrializing biotechnological processes.

But the biotechnological industry includes not only the production of biotechnological products but also the creation of conditions for using the procedures. Precisely these tasks, important for innovation, were stressed by the Ninth Meeting of the Central Committee of the SED: "Rapid technological progress in many areas requires with inexorable consequence a higher quality of machine-industrial and electrotechnological/electronic products and demands a corresponding formulation of their assortment."¹³

The necessary conditional advancements "accompanying" the biotechnological innovations are multifaceted. There arises a production of specific biochemicals and fine chemicals and the manufacture of biotechnological apparatus (for example devices for analysis and synthesis in gene and immune techniques, bioreactors with specific requirements for various fermentation processes). Thus plant construction is faced with new tasks associated with the peculiarities of biotechnological production the mastering of which significantly influences economic success and also the chances for technology export; however, they also pose conversion and restructuring demands in plant construction, etc. Process control and guidance with microelectronic data acquisition and processing must be developed. Biotechnological production requires the direct collaboration of scientific laboratories on the basis of a high level of basic research in the relevant branches of the biosciences and technical sciences, not only for working out useful biotechnological procedures and making available highly productive strains or bioagents but also, in addition to transferring the research results into practice, for maintaining and further advancing production performance and security, product quality, etc. A complex development of productive force takes place the mastery of which also places new demands on management and planning.

Modern biotechnological procedures develop in association with various fields of application. The new possibilities are snatched up by various branches. They use biotechnological procedures in part jointly, and in combination with physical and chemical processes. Thereby it is important for the initiation, course and effect of biotechnological innovations whether they affect an already existing production direction, have supplemental and restructuring effects there, or whether completely new usage values and production fields are formed, whether and to what extent known or available mass-technological machines and layouts can be used in their introduction or new types of means of production must be developed (from the means of research such as apparatuses, methods, materials).

Similarly to microelectronics: biotechnology can improve available products and production lines (for example, in the baked goods and beverage industries) but it can also bring about new types of products or methods of preparation (such as antibiotics or the microbial production of active materials). Such types of developmental conditions and associations have a strong influence on processes and factors such as:

the scale and priorities of effectiveness criteria, the organization and course of the innovation process, the difficulties of initial innovation, extent and structure of the necessary new and changed production requirements, the structural development of the field of usage of biotechnological innovations, the optimal market portion of biotechnological products, period of investment return, renewal share of the basic funds.

The living organisms, parts of living organisms, or products of living things used in biotechnological procedures did not arise originally for industrial utilization. They have much rather developed and "specialized" for an existence under natural conditions. This requires particular efforts toward production stability (such as the growth and preservation of the organisms used, sterilization, sterile handling, maintenance of the production level, purification and separation of products).

Modern biotechnological procedures each require specific conditions with respect to implements, biochemicals and fine chemicals. However, these simultaneously provide new possibilities for exports. They are often also an important requirement for issuing licenses. For instance, gene technique is characterized by high dynamics and a specific complexity of procedures and techniques, and also of the spectrum of necessary bio-, radio- and fine chemicals. The expected changes in the genetic material can only be achieved if the required conditions can be produced in their entirety and at the proper time. This demands high flexibility in planning and great responsibility on the part of the research director in the realization of research conditions.

Innovations demand relatively risky production preparations and preliminary production growth. In some directions of biotechnological advancement, among others, special, often smaller industries were formed for the purpose. The specific requirements of biotechnological innovations obviously underline the importance of techniques, pilot plants and experimental production in the framework of combinations or scientific installations where leading research scientists carry active responsibility and make it possible to live up to the required specific demands for limiting the risks of set-backs and developing the ability for expansion in the case of successful progress. In suitable cases, such types of plants could grow with the positive scientific-technical results all the way to initial production.

On the one hand, biotechnology is a factor of national economic intensification. On the other hand, intensive national economic growth is an important prerequisite for assuring the required conditions for the development and use of biotechnological procedures. Increasing the productivity in already producing plants can also create potentialities; for instance, the increased production and higher efficiency of certain enzymes can also provide capacities which can then again be made available for the production of enzymes in other areas of use.

Furthermore, problems and tasks arise in view of additional social requirements. Patent rights and production security are in need of further development when biological organisms and agents are used technically. The patentability of organisms and products, just as their harmlessness to the health of the producer and user (consumer) is up for discussion.

The qualification of the workers in industrial enterprises using biotechnological procedures is among the important conditions for success. As shown by experiences with successful new developments, precisely the initial developments of innovations are decisively influenced and propelled by top level workers. Therefore, the training of specialists for research and industry is very

important. Research installations founded on the realization of biotechnological developments are carrying great responsibility for it. Furthermore, the general educational contents are also expanded. On the part of as broad a circle of population as possible, an understanding is required of the use of biological principles and their significance in shaping our lives. Thereby, the long years of comprehensive polytechnical and scientific education in our schools gain practical importance and provide a good basis; but new, progressive aspects also arise.

Strategy Formulation, Continuation

It is precisely the specific diversity and complexity of biotechnological developments and potentialities, and also its high level of demand, which underline the importance of strategic investigations for the preparation and funding of scientific-technical decisions to introduce long-range developments and to prepare the corresponding programs; to continue them later and, in some cases, also to make them more precise according to the increasing progress in knowledge and increasing social demands.

The SED program urges to conduct research "always guided by the needs of society, by the reproduction demands of the socialist national economy and the state of development of each scientific discipline;"¹⁵ in the developmental relationship characterized thereby, analyses of innovative possibilities and processes could then point out the centers of gravity of productive strength dynamics and the potentialities for increased creation of new values. In strategic elaborations for the support of decisions involving innovations in the field of biotechnology, answers, problem presentations and developmental forecasts involving the following problems were shown to be important and reasonable:

international status and analytic-prognostic comprehension of the developmental trends in the advancement of knowledge and in its industrial realization, and also of the eventual shift points and breakthroughs (scientific-technical prerequisites, economic conditions for realization, possibly also socioeconomic consequences of innovations); state of research and of the pertinent industry in the GDR, associated developmental potentials and developmental requirements; effectiveness potential of the possible innovations; centers of gravity and possible time stages for the realization of innovations in the GDR including the provision of scientific-technical prerequisites and conditions for industrial use;

consequences to the GDR if innovations are not carried out or are delayed; risk areas and risk developments when innovations come to pass;

conclusions and directive proposals (such as about urgent developmental directions, room for decisive action and area of decision, profiling the research potential, agreement with the involved ministries and combines, toward national and international cooperation, toward securing the task at the level of all parties concerned, toward training and advanced training of suitable specialists, toward continuation of the conceptual/strategic work).

But the concrete potentialities of biotechnological developments, their limits estimated on the basis of the laws of nature and the economy, the preferred variants and areas of application can only be comprehended in a sufficiently decision-relevant manner if they are analyzed in the context of the developmental problems of the affected or tangential complexes of need and of the industrial branches.

FOOTNOTES

1. Ninth meeting of the Central Committee of the SED, "Aus dem Bericht des Politburos an das Zentralkomitee der SED" [From the report by the Politburo to the Central Committee of the SED] report by: E. Honecker, Dietz Verlag, Berlin 1984 p 30.
2. *ibid.* p 40.
3. *ibid.* p 37.
4. See: J.A. Owtschinnikow "Die Biotechnologie und ihre Rolle beim wissenschaftlich-technischen Fortschritt" in Russian [Biotechnology and its Role in Scientific-Technical Progress] WESTNIK AKADEMII NAUK USSR No 4, 1982 pp 4-24; M. Ringpfeil "Biotechnologie - Inhalt und Methoden" in "Entwicklungsprobleme und Effektivitätsvermittlung in der Biotechnologie" [Biotechnology - Content and Methods; in: Developmental Problems and Effectiveness Mediation in Biotechnology] KOLLOQUIEN DES INSTITUTS FÜR THEORIE, GESCHICHTE UND ORGANISATION DER WISSENSCHAFT DER AKADEMIE DER WISSENSCHAFTEN DER DDR No 36 1984 pp 3-29; E. Schwerdtner "Schlüsseltechnologien der achtziger Jahre" [Key Technologies of the Eighties] DIE UMSCHAU No 5, 1983, pp 140-143.
5. See H. Maier "Wissenschaftlich-technische Neuerungsprozesse, Effektivität und Strategienbildung" [Scientific-Technical Innovation Processes, Effectivity and Strategy Building] WIRTSCHAFTSWISSENSCHAFT No 11, 1981 pp 1313-1329; H. Maier "Strategienbildung unter den Bedingungen der wissenschaftlich-technischen Revolution - Probleme der Erhöhung des Beitrags der Grundlagenforschung zur Innovationskraft der Volkswirtschaft" [Strategy Building Under Conditions of the Scientific-Technical Revolution - Problems of Increasing the Contribution of Basic Research to the Innovative Strength of the National Economy] WIRTSCHAFTSWISSENSCHAFT No 11, 1984 pp 1614-1629.
6. See H. Ruttloff, J. Hempel "Zum Einsatz von Enzymen bei der Lebensmittelproduktion" [The Use of Enzymes in Food Production] ERNÄHRUNGSFORSCHUNG No 4, 1980 p 104.
7. See, among others, "Biotechnology, International Trends and Perspectives", OECD, Paris 1982 pp 13 and 33.

8. See J. Semel, R. Steiner "Nachwachsende Rohstoffe in der chemischen Industrie. Versuch einer quantitativen Erfassung und Bilanzierung im Vergleich zu fossilen organischen Rohstoffen" [Renewable Raw Materials in the Chemical Industry. Attempt at a Quantitative Comprehension and Balancing in Comparison With Fossil Organic Raw Materials] CHEMISCHE INDUSTRIE No 9, 1983 p 494.
9. See M. Koch "Erfahrungen, Ergebnisse und neue Anforderungen an die strategische Arbeit auf dem Gebiet der Grundlagenforschung, unter Berücksichtigung erster Erfahrungen bei der Entwicklung der Gentechnik" [Experiences, Results and New Demands on the Strategic Work in the Field of Basic Research Taking Into Consideration the Initial Experiences in the Development of Gene Technology] in: "Hoheres Niveau strategischer Arbeit und Herausbildung innovationsorientierter LeistungsmaBstabe in der Forschung. Informationen fur die Leitung der Forschung/Gesellschaftswissenschaften" [Higher Level of Strategic Work and Development of Innovation-Oriented Productivity Standards in Research. Information for the Management of Research/Social Sciences]; Academy of Sciences of the GDR, Scientific Information Center No GW 29, 1984 pp 45-55.
10. See Ninth Meeting of the Central Committee of the SED, *ibid.* p 33f.
11. See P. Hanke "Probleme der Ermittlung aussichtsreicher biotechnologischer Innovation auf dem Gebiet der Ernährung" [Problems of Obtaining Promising Biotechnological Innovations in the Field of Nutrition] in: "Entwicklungsprobleme und Effektivitatsvermittlung in der Biotechnologie" [Problems of Obtaining and Conveying Effectiveness in Biotechnology], *ibid.* pp 30:66.
11. See J. E. Flinn, E.S. Lipinsky "Production of chemicals via advanced biotechnological processes" in BIOTECH '83, Northwood 1983 p 537.

Agricultural Application Stressed

East Berlin SPEKTRUM in German Vol 16 No 7, Jul 85 pp 1-4

[Article by GDR Academy of Sciences member Manfred Ringpfeil, director of the Life Sciences and Medical Research Branch; and Dr rer. nat. (natural science) Henning Pickert, Institute for Biotechnology. Original title: "Biotechnology and Agriculture."]

[Text] The national economy of the GDR expects much from the utilization of results of biotechnology, a research area with much future promise. The 9th meeting of the Central Committee of the SED [Socialist Unity Party of Germany] has also emphatically challenged the participating scientists in basic research and in the agricultural research and experimental establishments to put themselves to this task.

On the one hand, we consider biotechnology to be the application of biological processes in industrial production and in the provision of services organized on an industrial scale. This clarifies its position between agricultural production which uses more highly developed biological organisms for converting materials and chemical-industrial production which uses principally abiotic systems for converting materials. On the other hand, during the past years, a self-sufficient area of science has developed which, based on both the technical and economic sciences, is also designated as biotechnology and must be classified among the applied sciences.

The attractiveness of biotechnological processes includes first of all the possibility of making new products, of using new, energetically advantageous procedures and of using formerly inaccessible raw materials. Their introduction into agricultural production is based on features such as energetic effectiveness of the processes, simpler manageability and more robust construction of the equipment, and also the intensifiability and expandability of the established installations. The application of modern methods such as gene technology, immune technology and cell culture technology in agricultural production is a task very closely associated with the widespread use of biotechnology. In animal production, it is concerned with optimizing the quality and production of fodders and also with solving problems associated with the nutrition, growth, rearing and health of the animals. In plant production, it extends especially to the improved specific properties of plants, for example nutritional content, yield, rate of growth, tolerance to stress and resistance to damaging factors, and also to the introduction of new methods of plant cultivation. Up to now, the increase in agricultural production has been achieved not only through its intensification but to a considerable measure also through the provision of energies and auxiliary materials from other areas of the national economy. But the limiting conditions of all material productions have been changed, mostly as a result of increasing costs or of problems with the availability of fossil raw material sources. In the GDR, the increase in national income must be achieved without an absolute increase in the use of energy or material resources. Moreover, a further increase in the provision of auxiliary materials to agricultural production begins to show consequences--one should consider the accumulation of waste products, the local disturbance in ecological balance and the lowering of soil fertility.

The system-analytical consideration of the agricultural production system indicates that so far an intensification, above all, of the partial systems of plant and animal production has occurred. But the third, unquestionably important partial system of agricultural production, the microbial system, has not been adequately increased. It is necessary and possible to develop this system within agricultural production from an auxiliary to a production system thereby substantially contributing to a more effective structuring of agricultural production. In following this road, the goal can only consist of activating and intensifying the internal circulation of materials and energy within the agricultural production system. The results will include a more complete use of the primary products produced, a more complete utilization of available energies and increased variability and productivity of the total system including the delivery of products from the microbial production system. The means for intensification of the microbial partial system include the use

of animal waste products and surplus plant products, on the one hand, and the economically more advantageous use of external raw materials and energies, on the other hand.

Microorganisms Nearly Universal

A scientific preparation is at hand for such a development. It is based on the nearly universal properties of microorganisms with respect to substrate utilization, energy supply and product formation. They open the following possibilities. Nearly all organic substrates, even those produced by agriculture, can be microbially converted. Thus, from as many chemical materials as one wishes, a few (for example biomass or methane) or from certain ones such as particular carbohydrates, only certain materials (for example ethanol or lactic acid) are produced.

Certain microorganisms unfold their productive activity even under conditions--perhaps a high temperature or an acidic medium--which provide protection from the competing effects of undesirable microorganisms.

Microbial biomass can also be immediately obtained from the aqueous suspensions and can also be employed as a catalyst in the production of energy carriers or of usable materials.

The abundance of such possibilities provides the basis for the development of locally adapted, more effective system solutions.

Technologically Interesting Concepts

Technological preparation is also given. From the scientifically discovered solution possibilities, concrete developmental concepts can be suggested which, because they are based on thoroughly valid, effectiveness-determining properties of microbial systems, have a high capability for generalization:

The mixed substrate concept: the energy dissipation which frequently occurs when a single substrate is used can be avoided by the simultaneous fermentation of several substrates with the application of balanced conditions between energy and substrate delivery. By the addition of external carbon sources, an additional possibility presents itself for an increase in the productivity of the fermentation set-up.

The concept of protected fermentation: higher fermentation temperatures in cases of exothermal microbial conversions inhibit undesirable competing reactions. In addition, the cooling expenditures are lowered. A more complete utilization of the wasted heat as useful energy can be considered. Microbial reactions in an acidic medium also give selection advantages to the production culture. Costly sterilization measures can be dispensed with.

The concept of biosystem technology: by the optimal design of suitable coupled systems material and energy losses are avoided, elimination of the by-products can be coupled to the yield of valuable materials or energy carriers, coupling of biomass production to the preparation of mixed fodder through the utilization of biomass suspensions, the coupling of weakly exothermal anaerobic to strongly exothermal anaerobic systems.

The concept of simple technology: the design of apparatus- and system-technological solutions which guarantee high work productivity through reliability and stability.

Solutions for Application

In the Institute of Biotechnology, solution proposals are being worked out for the introduction of biotechnological procedures in agriculture; at present they are only available as individual examples.

Thus, the availability of the output from plant production to the animal sector will result in the attribution of a high level of importance to the conservation, over longer time periods, of fodder plants (leguminous) high in protein and relatively low in carbohydrates. In dried silage, agriculture has a traditional method which, however, is strongly dependent on weather conditions. Stabilization of silage processing in a manner independent of the weather occurs through the microbiological oxidation of ethanol to acetic acid with the simultaneous use of oxygen present in the fodder stock. Using this principle of aerobic acidification in combination with biological deoxidants, the conditions necessary for successful silation are made available; these are anaerobiosis, permeabilization of the plant tissue and a protective hydrogen ion concentration facilitating lactic acid fermentation.

The external production of the ethanol-oxidizing bacterial suspension and its incorporation into the plant mass as the silo is loaded represents a partly industrialized process the improvement of which is the subject of biotechnological research. An other goal is to use a microbial method for producing formic acid from the industrial raw material, methanol, in the course of the silation process. An attempt will be made to produce, with the help of gene technological methods, microorganisms capable of such performance.

Another path for overcoming the weather dependence of traditional fodder plant conservation is presented by the transfer of the sour fermentation juice appearing in the silation process itself into a second silage. This is undoubtedly the simplest possibility for stabilization of the silation process based on microbiological-biochemical reactions. The deeper scientific penetration into biochemical reactions will help to answer the current questions raised about the technological consequences of circulating the fermentation juice and to elucidate the economic consequences arising from the possibility of combining the methods for stabilizing the silation process.

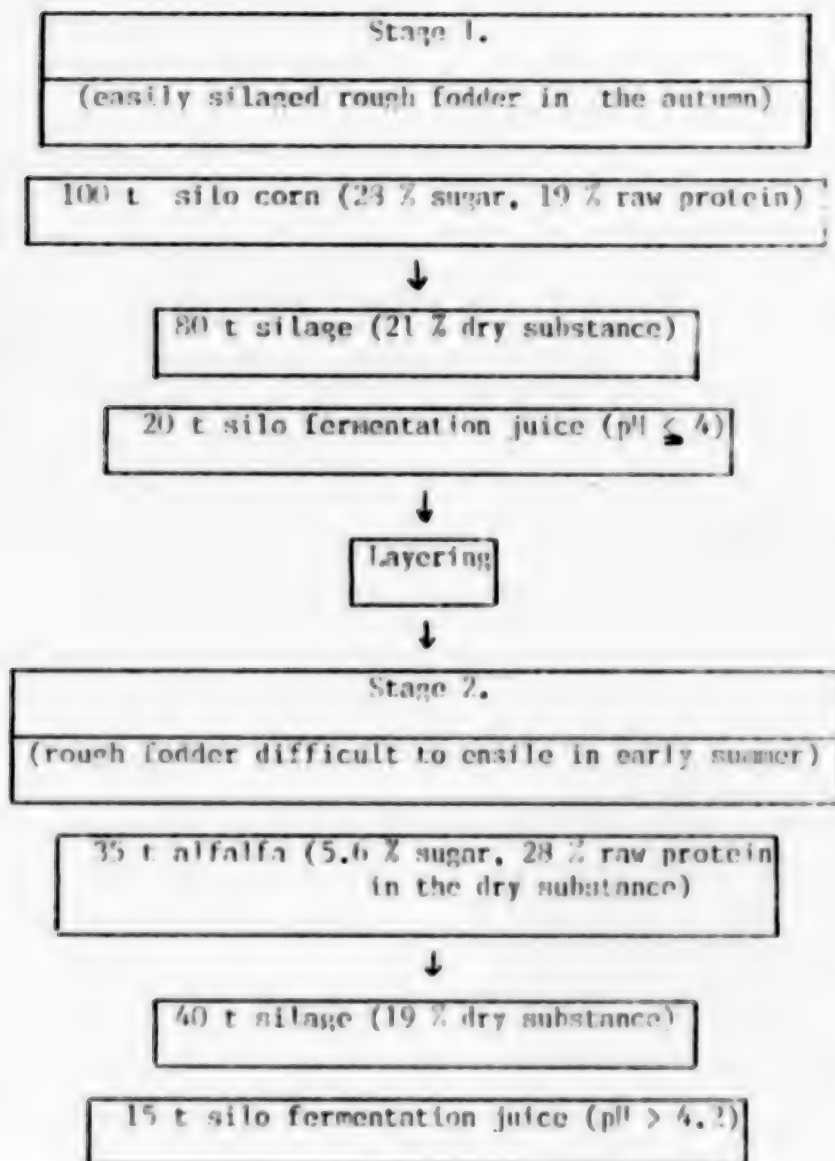
One example of microbial transformation of products from plant production for use in animal production, a method known in principle, involves increasing the protein content of straw. From the organic substances contained in straw, cellulose and hemicellulose, upon the addition of inorganic nutrients and oxygen, a high-protein biomass is formed through microbial culture. The problems still to be solved by biotechnological research are in the areas of both science and technology. In the former, the extent of the utilization of hemicellulose as substrate for the microbial culture should be improved. In the latter, the productivity and stability of the microorganismal cultures used should be retained in the transition from a currently used liquid

fermentation to a solid fermentation without a discrete aqueous phase. An important role is played by the economically and biologically effective pre-treatment of straw. In the end, one must find the most purposeful incorporation of such a process into the agricultural production structure. (See SPECTRUM No 5/84 pp 18-20.)

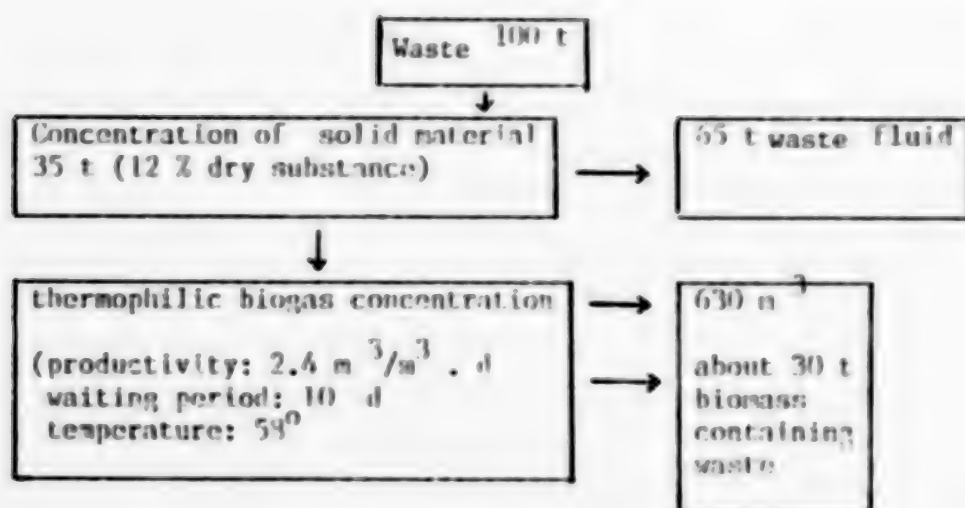
The microbial conversion of various organic substances to methane, the basis for biogas production, is also an already traditional biotechnological process where byproducts from the animal sector are used to obtain energy carriers. Results of the thermophilic process management of methanogenesis open up new paths to make the procedure more economical and pose the task of finding complex location-specific solutions. Shorter waiting periods in connection with concentrating solid material, which permit high concentrations of dry substance, lead to higher productivity and a lower energy requirement of the installation; this is synonymous with a higher net energy gain. Solutions for utilizing the organic and inorganic components of the fermentor waste should considerably raise the possibilities of increasing the productivity of the microbial sector in the agricultural production structure. (See SPECTRUM No 10/82 pp 11-14.)

The example of converting starch-containing products of plant production to basic chemicals also has a traditional character. In addition to the biochemical reaction of enzymatic conversion of starch to glucose, ethanol is produced in a subsequent fermentation step. The technological structuring of the entire process as simple technology should make it possible for smaller installations to do it economically under agricultural production conditions and to utilize starch-containing byproducts as substrate. The task is to provide solutions toward a higher energetic effectiveness of the separation of ethanol from the process fluid or toward possibilities of an effective utilization of the culture fluid even without ethanol separation. In certain locations, combinations with biogas production and with aerobic microbial fodder protein production are paths to be tried.

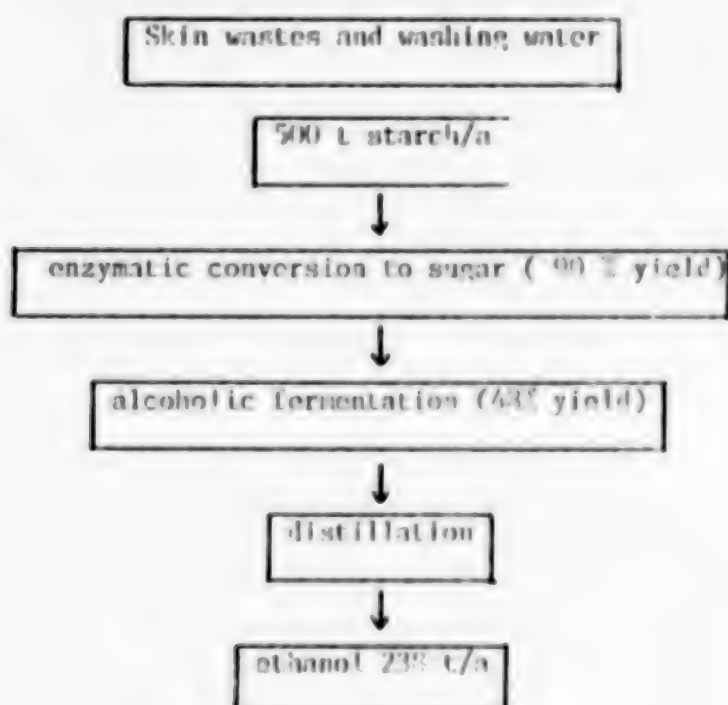
A basic task, and a much discussed topic, is the supply of raw materials to industry from regenerable resources through agriculture; such possibilities by means of biotechnological methods are beginning to appear. They are concentrated on cellulose-, hemicellulose- and lignin-containing plant materials produced photosynthetically with the help of freely available solar energy. Cellulose is the most important among them. It is uniformly built from glucose molecules and there are known biochemical means for increasing the hydrogen content in the product molecule. Reaction products such as ethanol, butanol, 2, 3-butane-diol, lactic acid and acetone are, at the same time, direct or indirect starting materials for chemical syntheses. But the biochemical conversion of the basic hemicellulose bodies (pentoses) with methanol to hexoses and the microbial decomposition of lignin to its aromatic monomers also pose tasks for basic research which can lead to technically useful solutions.



1. Two stage wet silage from rough fodder (20 % dry substance)



2. Thermophilic biogas production from cattle waste (standardized for 100 t)



3. Ethanol production from wastes of an agricultural potato skin installation

Conclusions

On the basis of the theoretical concept of industrializing the microbial sector of agricultural production, examples can be given for activating the inner circulation of the agricultural production system. Numerous points of departure are available for targeted further development in this area which include the intensification and rationalization of total agricultural production, the better utilization of waste products and energies, the production of new, additional products and improvement of the (local) environmental situation.

The universal property of these systems, which scientific and technological research must come to term with, is represented by slight concentration and temperature gradients alongside which considerable amounts of material and heat must be made useful in order to keep them from dissipating in the environment. This requires not only specific procedures and apparatus but also their complex connection. Their development proceeds through pilot systems which, in accordance with the complexity and specifics of the task, take on the character of model territories.

With the introduction of biotechnological processes in agricultural production, demanding tasks arise which require the coordinated input of scientific, technical-scientific, economic and not least agrarian potentials. Corresponding to the practical area where this development takes place, the agricultural sciences and agrarian practice are assigned a decisive role in directing these processes.

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HUNGARY

HOW TO ACHIEVE SUCCESSFUL ECONOMIC MANAGEMENT

AU111453 Budapest MAGYAR NEMZET in Hungarian 1 Oct 85 p 5

[Article by Dr Antal Stark, university lecturer: The Possibility of Full-Scale Development"]

[Excerpts] Presumably, the statistical figures stipulated in the Sixth 5-Year Plan will not be realized, but it is still an achievement that the trend of our economic progress accords with the plan and that we have achieved most of our main targets. Our achievements and difficulties have put on the current agenda the issues of reevaluating our economic policy, accelerating our development, and strengthening the intensive characteristics of our policy. Our intentions to solve these problems have been well represented in the currently prepared Seventh 5-Year Plan for the period 1986-90.

Foreign economic relations strongly influence the possibilities of our economic development. We can presume to count only on a restrained increase in the import of materials and energy. The conditions for our sales abroad are also unfavorably influenced by increasing price competition and growing demands for quality.

The April 1984 decision of the MSZMP Central Committee was formulated with the aim of fulfilling, promoting, and enforcing the growing demands for efficiency. It would be unrealistic to set a target for dynamizing economic development without a significant reorganization of economic management. Theoretically, we could choose among several solutions for accomplishing this changeover.

When Income Motivates

One of the solutions is intensifying the elements of direct management--as it is done in some other socialist countries. It is assumed that with this method the rate of progress could be boosted, but a lasting development in our open economy would be less probable. Neither can the other methods offer a solution, if the type of decentralized economic mechanism, in which central planning only affects a few macroeconomic factors. However, the economic mechanism based on self-regulatory factors would create a domestic market competition providing for the following factors: a possibility of acquiring capital as a result of income differentiation, the dissolution of the export-import monopoly, and a restriction of the state's role in economics, all this

to an extent which can neither be considered compatible with socialist principles of ownership nor with our belonging to the socialist economic community.

If the basic requirements of the 1968 reform of economic management--with a few corrections--are completely fulfilled, this will assure the desirable levels of the mechanism for intensively and dynamically developing the economy.

The vital question of the development of our economic management system is the regulation of incomes paid by enterprises. The primary aim of the change is to assure a differentiated opportunity of development so that the successful enterprises will have a chance of developing dynamically while those of lower efficiency would be forced to deteriorate.

Naturally, there are two requirements for making income regulation fulfill its primary goals of making possible, stimulating, and enforcing an intensive and dynamic development and at the same time ensuring the centralized income of the state: an objective price system oriented toward further development and the mobilization of resources (labor and capital).

Accelerated Processes

A price system that best serves the goals of economic policy is clearly an internal price mechanism that is adjusted to the prices on the world market. Only thus could an international value judgment be established, and this could mean the development of a real economic competition. The distortions in our present price structure (industrial-agricultural price relations, producer-consumer price relations) and the production factors (material, energy, means of production) can only be eliminated stage by stage. However, in this way it will be necessary to maintain an extremely high level of state taxes and a great amount of unhealthy state support. Consequently, the desirable functions of income regulation may also develop only stage by stage.

The 1985-86 changes in the economic regulators will make it possible to generate favorable processes in our economy, but because of the stage-by-stage solutions already mentioned, a longer period of time will be required for arriving at a steady acceleration in our development.

A vital condition for intensive management is the growing significance and role of the monetary system and the use of an active monetary policy. A monetary system operating on the basis of a state preference [English word used] system combined with business transactions should curb the state's role in withdrawing or supplying funds from or to enterprises focusing monetary activity of financing nonmaterial activities, namely, projects of social policy. Only thus can the amount of money available for increased mobilization [English word used] and differentiation [English word used] increase on the basis of real managerial achievements.

Socialist economic management is inconceivable without central planning. It is, however, necessary to reassess the role and meaning of planning because this reassessment is a condition for establishing a monetary system.

The most important signs of successful economic management are improved effectiveness of the mechanism of economic regulations and the strengthening of their orientation toward specific purposes. We must ensure that one economic regulator does not neutralize the effect of another regulator and that legal provisions are provided for validating the mechanism of interests.

Undoubtedly, this is a very difficult problem, because the history of our economic management is a history of constant conflicts in regulations. The most important issue today is that our society and economy endure the transitional period with loyalty [lojalisan] and be engaged in cutting its length to the minimum.

/12712

CSO: 2500/83

HUNGARY

NEW REGULATORS SPELL AUSTERITY, COMPROMISE

Budapest NEPSZABADSAG in Hungarian 29 Oct 85 p 4

[Unsigned article: "Regulator Changes in 1986; Briefing in Parliament"]

[Text] Workers of the press were briefed Monday in Parliament about the changes in income and earning regulation to be expected in 1986.

In his introduction Deputy Minister of Financial Affairs László Bekesi pointed out that the government does not plan crucial changes in the regulator system which went into effect at the beginning of 1985. But changes will be needed at a few points--primarily because of the constraining effect of the unfavorable economic processes. The basic purpose of these is to aid and stimulate implementation of the 1986 plan. The most important tasks before the country continue to be preserving and improving the economic balance, protecting and raising--as a function of the income producing capacity of the economy--the standard of living and giving life to the economic upturn. The regulator changes are intended to reach these goals primarily by encouraging more vigorously an improvement in the efficiency of production, an increase in economical export, conservation and technical development. Moderating inflation will also be an important task in the coming year.

Changing Taxes

It is evident from the ideas for next year that the expenditures of the budget cannot be reduced. For the time being the enterprise supports cannot be moderated and the budgetary burdens will increase further with the development of the infrastructure and an augmentation of social policy payments. It follows from all this that the moneys needed to carry out our plans can be withdrawn only from the sphere of management and so there must be a certain readjustment among the forms of withdrawal for enterprise incomes.

Istvan Kollarik, department chief in the Ministry of Financial Affairs, described some of the concrete regulator changes. According to him the profit tax will be increased next year by 5 percent (from 35 to 40 percent). The tax will increase by 3 percent--from 35 to 38 percent--for organizations paying a gross income tax. At the same time the accumulation tax will be reduced by 3 percent (from 18 to 15 percent). The magnitude of the accumulation tax will be set at 8 percent for export development investments and for some investments in major government programs.

Going beyond the change in the magnitude of the taxes there will be a gradual elimination of the temporary concessions in income regulation. For example, the wage tax concession will end or will be gradually eliminated up to 1987 in a number of areas--in the above ground construction industry, at research institutes, at some technical development enterprises, in foreign tourism catering and at two book distributing enterprises. The property tax concession will end in 4 textile industry branches--in the cotton, wool, linen, hemp and jute industries and silk industry--and in highway and air transportation.

A number of measures will attempt to aid capital flow among managing organizations. For example, in order to enliven trade in used fixed assets the purchase of such goods--activated prior to 1 January 1985--will be relieved of the accumulation tax. Profit and property tax concessions will support the creation and operation of trading companies. Tax conditions connected with leasing out machines and equipment will change; the accumulation tax on acquisitions serving the purpose of leasing will be a uniform 8 percent for enterprises and financial institutions.

Tax concessions will also aid the attainment of major goals important from certain socioeconomic viewpoints. For example, housing construction by enterprises will be encouraged by a measure according to which the enterprises can retain from the profit tax 20,000 forints, in general, for finished dwellings delivered, 24,000 forints in Budapest. In order to ease the burdens connected with skilled worker training the enterprises will be exempt from property tax and accumulation tax on investments for such purposes or from the obligation to pay a wage tax on earnings. In order to encourage employment rehabilitation for those with changed work capability the managing organizations can place financial awards received under this heading directly into their interest funds. Domestic trade enterprises will get a profit tax concession for commercial activity performed in small settlements, and beginning in 1986 the wage tax will not burden the shift or overtime supplement at the foodstuffs stores that are open and operating seasonally.

This series of measures--Istvan Kollarik emphasized--will serve two purposes. On the one hand they are intended to stabilize the balance of the economy and the budget, and on the other hand they are intended to create conditions for more dynamic development.

Level Regulation Primary

Lajos Konya, vice president of the State Wage and Labor Affairs Office, said in connection with the changes expected in earnings regulation that the basic design of the regulation will not change. But the preliminary plan ideas take into consideration a lower price level increase than this year, and the quantitative system of earnings regulation must be adjusted to this as well.

The vice president said that the level of earnings in 1985 is expected to rise by 7.5-8 percent, almost in accordance with what was planned. But counting on an increase in the consumer price level in 1986 substantially lower than this year, nominal earnings also will rise at a more moderate rate, by 5-5.5 percent according to preliminary thinking. It follows from this that the modifications now being planned are directed primarily at tightening or increasing the requirements.

The experiences gained during the part of the year already past from the system of earnings regulation introduced in January were used to make the regulator changes. These indicate that earnings regulation functioned well in general, it encouraged greater performance and contributed to a differentiation of earnings according to work accomplished. It aided the development of enterprises and cooperatives which work with better efficiency, forced an improvement in the level of work at the weaker end and held back an ill founded increase in earnings. Results can also be found in manpower management; the hunger of the enterprises for personnel moderated.

One basic aspect of the 1986 changes is that the circle of enterprises listed in earnings level regulation will expand--in accordance with earlier thinking. Thus a number of enterprises previously belonging to earnings increment regulation will be transferred to this form. The newly formed subsidiary enterprises belong here from the start and it will be permitted that those enterprises which previously chose increment regulation for 3 years can transfer themselves to level regulation after one year.

Fewer Concessions

The area of temporary concessions will narrow in 1986. Next year there will be fewer branches and enterprises listed in central earnings regulation on the basis of ad hoc judgment.

The tax burdens connected with increasing earnings will rise in general. The smallest increase will be in earnings level regulation; the change here will affect only the lowest earnings bracket. Among those in central earnings regulation the possibility for a tax free earnings increase will be 4 percent--as opposed to 5.5 percent this year--and this can be supplemented by only an additional one percent even when taxed.

In accordance with previous thinking the linear extra tax linked to added value will be moderated from 150 percent to 75 percent. A new element will enter regulation to hold back very high earnings increases; an additional, heavy (500 percent) tax payment obligation will attach to an average earnings increase above 10 percent--and this is valid for every regulatory form.

This year enterprises belonging to strict earnings regulation could increase earnings 2 percent tax-free, 1 percent when taxed. Next year these ratios will be reversed: 1 percent will be tax-free, the taxed earnings increase possibility will be 2 percent.

The operation or introduction of a general export preference system is not planned, as was true this year. The premium system introduced this year for those in higher leadership positions will not change either.

8984

CSO: 2500/74

HUNGARY

EDITORIAL ATTEMPTS TO LESSEN SHOCK OF NEW REGULATORS

Budapest NEPSZABADSAG in Hungarian 4 Nov 85 p 3

[Article by Laszlo Karcagi: "That Certain 5 Percent"]

[Text] The briefing held last week in Parliament about the 1986 changes in the economic regulator system was intended for the general public but it said a lot primarily to economic experts. It said that the new regulation which went into effect at the beginning of the year had proven itself, there is no need for substantial change, only a few points must be touched now. In any case, certain changes for 1986 had been decided on last year in that temporary exceptions were applied in some areas when changing the economic guidance system--to facilitate the conversion. Now some of these regulatory exceptions are ending, in accordance with the original thinking.

Withdrawal Cure

In other areas it turned out during the year that the severity of the regulation needed to be eased somewhat, primarily to remove obstacles from before the realization of some of our major social and economic policy tasks. The moderation from 18 to 15 percent of the accumulation tax introduced to keep a rein on enterprise investments, for example, serves this purpose. The accumulation tax is being reduced to a more significant degree in the case of developments intended to increase export and investments serving implementation of major government programs. Capital flow among enterprises is being encouraged, the burdens of skilled worker training and job rehabilitation are being eased, the development of commerce in areas thus far not served is being aided.

All these measures fit into the main line of our economic development thinking. Now very many--primarily in the enterprise realm--are finding fault--not with these changes but rather with the fact that the enterprise profit tax is being raised by 5 percent, from 35 to 40 percent, and that the gross income tax of small cooperatives is going up from 35 to 38 percent.

However we turn the matter, this measure--the material effects of which in the life of the enterprises far surpass all the other changes--does not fit in very well with the economic guidance measures decided on earlier. Increasing

the profit tax does add to the already serious burdens of enterprise management.

Even earlier there was a very lively debate about the magnitude of the withdrawals from--that is, centralization of--enterprise income. Many feel that the budget already withdraws too great a proportion of the profit, little money remains at the enterprises so that they can develop. Obviously the present tax increase makes these problems more serious, further embittering the debates and the taste of the enterprises.

The waves of enterprise complaints after the almost numbing shock of the first few days--for even few of the pessimists counted on this sort of development in regulation--have now whipped very high. Nor does it very much console those expressing indignation that the government took this measure after long debates and not at all in high spirits--if one may use this expression. Economic guidance was forced to this step--it was said at the press conference held last week--because our economy this year did not produce the planned results, there is great backwardness in many areas--and unfortunately in those most important from the viewpoint of development. It follows directly from this that we will be able to begin next year, the first year of the Seventh 5-Year Plan, amidst unusually unfavorable conditions.

Receipts, Expenditures

We were not present at the preparation of the 1986 budget plan but with a little imagination--and of course, simplifying things a great deal--it is not difficult to imagine what happened. In one column they wrote up the expected receipts of the budget, in another its expenditures, they compared the two columns of figures, and it was immediately apparent that the two final sums differed from one another--the sum of expenditures was a good bit greater than that of receipts. At such times one usually goes through the expenditures item by item to see what might be reduced somehow, and thus tip the planned budget in the direction of a balance.

There could be no question of curtailing the social, cultural and health expenditures, because innumerable tensions deriving from a lack of money already pinch us in these areas. Of course, we might spend the resources available to us more cleverly, sparingly and effectively than at present--but let us not go into that now. The essence still is that one can hardly take anything from these sums.

Enterprise supports represent the other very big item in expenditures. The sum of these increased this year to a degree exceeding even the most pessimistic thinking. Many factors played a role in this. Providing only an impromptu list: coal mining had to be supported strongly because of the hard winter, the shortage of energy, the unfortunate development of geological factors and the long neglected developments; metallurgy and animal raising had recourse to budgetary aid due to the development of foreign market prices; and in the processing industry also there was a significant increase in the number of enterprises which could not stand on their feet independently.

One could moderate the supports and concessions--and as we noted in our introduction such steps will come up in 1986--but the area for such measures is quite narrow. According to many any further tightening would have a ripple effect causing disturbances which might endanger the economy's supply of primary materials and energy and fulfillment of our export obligations. In plain language, restricting supports on the expenditures side of the budget would, beyond a certain point, induce a reduction in receipts and so we would lose on the swings what we made on the merry-go-round.

Logical Decision

If it turns out that the sums on the expenditure side can hardly be reduced without the danger of a serious increase in economic and social tensions, then there is no other choice but to take a look at the other column--containing the expected receipts. What is a receipt for the budget is a withdrawal for the enterprises, so the question goes like this: Which withdrawal might we increase to bring the budget into balance while causing the least trouble?

Increasing the property tax is hardly a path we can follow. It is just the enterprises with lots of property which are in the most difficult situation today. Increasing their burdens would inevitably bring with it an increase in the need for supports on the other side; so we would be back where we started. We might increase the wage tax; but this would force the branches and enterprises with large personnel needs into an even more difficult situation, and might increase the demand for exemptions. Nor could anyone soberly recommend increasing the accumulation tax; on the contrary, our chief economic goals, growth and accelerating technical development, require a reduction in the tax, as has now happened.

As a result of this logical operation we come to what should have been obvious from the first--more can be taken only from where there is more to take. Profit is the only source from which the budget can draw more amply and cause the least damage--in a relatively short period--to the economy. This is probably why the choice fell on a 5-percent increase in the profit tax--increasing the receipts of the budget.

We say probably because--let us repeat--we were not at the debates deciding about the regulator changes, we have only tried to follow the birth of the decision in principle, a decision which is logical in the present situation.

We say that the decision is logical, but we must also see clearly that it is accompanied by gigantic disadvantages and dangers. There will now be a further strengthening of a practice which has been much and justly criticized, namely that the state taps the income of the enterprises which work best and most economically, especially the income of those which are most competitive in the level of management and in the freshness and quality of their products. This withdrawal practice clips the wings of just those who know how to fly--if you will forgive the simile.

The money taken from the profitable branches and enterprises in the form of a tax is redistributed by the budget; in plain language, it is pumped into the pockets of those operating at a loss. But the sum of the supports, and this is

a very old experience, is too much for death by starvation and too little for survival; so it does not really help them out of trouble, it only conserves the precarious existence of the enterprises and an obsolete economic structure. We cannot raise the weak while weakening the strong; it is not hard to imagine where this path leads. It is an emergency course which--if the economy cannot improve its ability to produce income--will lead to a gradual further deterioration of the competitiveness of the entire economy.

We know that we are on an emergency course, we know that it is most urgent to get off of it, that we must switch our economy to the "new growth course" so much talked of today. It was for this purpose that we created our very significant socioeconomic development programs which were confirmed by the 13th congress of the MSZMP. A further reduction of the outstanding debt, making the economy dynamic, raising domestic use, consumption and the standard of living, holding back inflation--all are goals connected with putting the economy on the new course. This year's further development of the economic guidance system was undertaken in the name of these tasks.

In light of our more distant goals and resolutions the regulator changes now announced for 1986 are certainly sufficient only to keep the economy on course--on the emergency course--but they are not capable in themselves of moving it in the direction of growth a good bit more dynamic than at present. And, of course, this is not their purpose. Other tasks, decided on longer ago, would be needed to aid this movement, and the very moderate economic achievements of this year show that the execution of these tasks is not progressing at an adequate pace.

Out of the broad range of tasks standing before us we now seize on one interdependent with our example, the necessity of moderating the supports. It can be easily seen that there can be only way out of the forced spiral of ever rising budgetary withdrawals and supports--moderating the supports. And in this there is serene theoretical agreement among economists and those responsible for enterprise and economic guidance--which does not happen too often.

In general the troubles begin when the fate of an individual support is being discussed concretely; at such times it usually turns out that an exception is unavoidable. And truly, let us only think where the economy might get to if we permitted the extraction of fuels to dwindle, or metallurgy, or the branches and areas of agriculture in a difficult situation. Nor can we do without a large part of the products of the processing industry which can be produced at a loss. The competitiveness of our economy, its ability to produce income, is too weak as a whole to make up from import for the production which might be reduced or eliminated by a reduction in the supports.

The Only Path

The resolutions urge development in two directions. On the one hand at those plants, in the case of those profiles and products, where it is economically justified we must create conditions and improve efficiency and profitability so that there will be no need for central aid. On the other hand, where all this cannot be done we must eliminate the activity and regroup the existing

material and intellectual capacities to other areas where they can produce greater profit.

All this, of course, cannot be done from one day to the next, but it must be done from one year to the next, from one 5-year plan to the next, with zealous, logical, systematic work. And we do not find enough signs of this today in the Hungarian economy.

But we should not be unjust. There are ideas around already, thinking is developing. It is true that for the most part these discuss rather one-sidedly how much money the state purse must devote to improve the "substance" of this or that branch, area or enterprise. These proposals seize the problems at the easier end. It is a general experience that economic and political leaders will undertake in only a few places the unavoidable tensions connected with structural change. But these tensions could be managed and solved locally with foresight and clever "preparation." But if we do not handle these tensions, however, they do not end, they break to the surface elsewhere in another form much more mysteriously, cause great difficulties and become national problems. The present state budget problems also indicate this.

We have ventured far, perhaps too far, from our starting point, the unfortunate fact being that it was necessary to raise the profit tax of the enterprises by 5 percent. But we must see that the fatal questions of our economy also lie in this not too significant change which affects only remotely the essence of our economic guidance. Among these fatal questions the most important is the pace at which we are able to continue the implementation of those social and economic reforms to which we have committed ourselves. And it appears from the present emergency measures that the implementation is more difficult than we had thought. But it is also certain that there continues to be only one realistic way to remedy our economic problems, that which the 13th congress of the MSZMP confirmed and on which we must progress consistently to the end.

8984

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HUNGARY

WAGE REGULATIONS FAIL AS PRODUCTION INCENTIVE

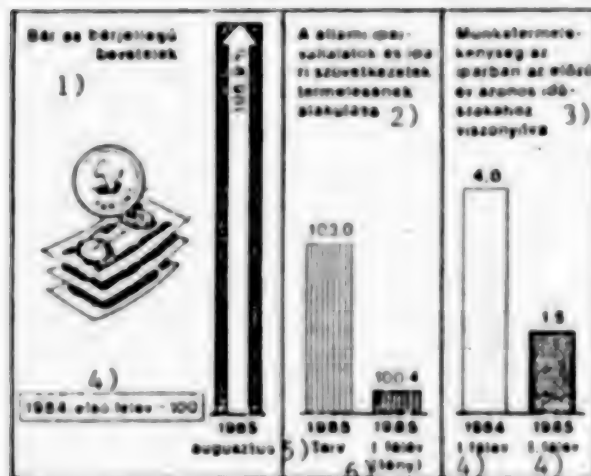
Budapest FIGYELO in Hungarian No 44, 31 Oct 85 p 3

[Article by Csaba Vertes: "Earnings Regulation: Facts and Arguments"]

[Text] It can already be said with certainty that this year--for the first time in who knows how many years--we need not fear an outflow of wages or earnings deviating from what was planned. The data for August-September indicate that the increase in earnings this year grew by 7.5 percent in accordance with the upper limit of the planned figure--possibly by a few tenths of a percent more. And since the reduction in personnel was more significant than expected the increase in earnings volume, planned at 7 percent, will not be higher either, indeed will not exceed the precalculated figure even if the average earnings should increase more than planned.

So the purchasing power regulating function of the new earnings regulation is working perfectly. Just let us remember that many objected to introduction of earnings level regulation just because they were afraid that this regulatory form in itself would be capable of upsetting the balance between purchasing power and the commodity base.

On the other hand, one of the basic principles of the earnings regulation valid since 1 January and introduced after many phases of experimentation--a basic principle more emphasized than all the others--was that in addition to its distribution function, regulation must tangibly strengthen its function of encouraging performance: economic, enterprise and individual performance alike. And unfortunately it can also already be said with certainty that this did not succeed. To put it differently, the rate of growth of production and national income lags behind the planned goal, i.e. the desired balance between earnings and performance is upset now not because the growth in earnings was greater than planned but rather because enterprise performance is a good bit smaller than planned. That is, for the time being the new type of earnings regulation is incapable of mobilizing the performance reserves which undoubtedly exist. At least this is what the facts, the economic events, indicate. (See the graph.)



Key:

1. Wage and Wage Type Incomes
2. Production of State Industrial Enterprises and Industrial Cooperatives
3. Labor Productivity in Industry as Compared to the Same Period of the Preceding Year
4. 1st Half
5. Plan
6. Actual

And here the arguments about earnings regulation begin, or rather continue with unchanged violence. According to many it is even a question whether wage and earnings regulation, essentially different from other elements of the regulator system and conspicuously centrally controlled, conforms to the reform at all. After some ruminations the debate partners generally agreed that regulation of the outflow of wages, keeping it strictly in central hands, was indispensable as long as there was no better method to regulate purchasing power. And since there is no better--automatically operating--method the wage regulation, or the earnings regulation now in effect, will influence job performance a good bit less than might be expected at any time. It follows--many experts say--that any expectation which hopes for a significant improvement in job performance from strengthening the incentive functions or from putting them into the foreground or which expects a restoration of the balance between purchasing power and the commodity base parallel with this is an illusion.

Others contradict the charges of an excessively centralized regulation by saying that the new scheme is more liberal and more flexible than any earlier one, that it gives the enterprises much more freedom of movement, that it has compelled the enterprises to take a number of very essential, long-needed management steps by virtue of standardization that represents the essence of the regulation. For example, level regulation--and the increment regulation

form too to a certain extent--has ended the interest in so-called personnel dilution. And, in fact, let us only consider that a wave of personnel reductions, not sufficient in scale by any means but still never before experienced, has swept primarily the state industrial enterprises and in addition it is a generalizable manpower management practice that those retiring usually are not replaced. In addition to this employers are choosing ever more carefully among those applying for work. Indeed, the wave of rational personnel management has splashed over into agriculture too. In Gyor-Sopron County, for example, the number of laborers in the agricultural operations has decreased by 3 percent--as a definite result of the new earnings regulation, according to the regional federation.

Very well, still others object, but what is the proof that the personnel reductions and regroupings can be attributed exclusively to the efficient operation of earnings regulation? Is it not rather that those who are dissatisfied with their earnings, felt to be justified on the basis of their performance, after some unsuccessful attempt to get a raise, ask for their work books and go to an enterprise which pays better? And if this migration is on a mass scale--and it is!--then what can those enterprises do which are competing for manpower, yet are in a worse wage position? Their wage payment possibilities may be more modest--for example because they were forced into central regulation or because they could not choose anything else but strict central regulation--so they try to remain competitive on the manpower market by relaxing the performance requirements or--and this also is characteristic--they exploit the possibility given by the uniform interest fund and neglect even the desirable developments in order to meet the wage competition by any means. Let us add, we are talking about a real and ever sharper competition. According to the data thus far there have been 10-15 percent wage increases just as much as those totaling 2-3 percent.

Some say that this is the differentiation possibility given by the regulator system--and at last we have it. Others warn--and not without cause, because they are relying on earlier experiences--that economic guidance will not permit this for long, because it is felt that a greater earnings differentiation among enterprises cannot be permitted free rein. Beyond a certain point they will intervene and try to even out the differences which have developed in a spontaneous manner, as a result of which there will be a release of supplementary wages encouraging inflation--without worthy performance requirements. And the realization of the balance and incentive functions of the earnings regulation system will be endangered.

How could it be otherwise--still others join in the debate--when one can see that the development of enterprise profit--on which the ability of the enterprise to pay taxes and wages theoretically depends--reflects actual profitability in a most uncertain way. If we link the wage and earnings payment possibilities of the enterprises, and of course their ability to pay taxes too, to a development of profit dependent on very contingent (external) factors and manipulation possibilities then what would encourage the enterprises to self-restraint in regard to profit increases or earnings increases essentially independent of place of work performance?

And then there are those who warn that we should at last try to interpret the concepts correctly. They also warn that no one should expect from earnings regulation something which cannot be its exclusive task. Earnings regulation cannot undertake to control the flow of purchasing power or to create a balance in the commodity base--it can only influence these things together with other elements of the regulator system. The earlier overemphasis of these functions--still felt today--was a political blunder. What is more, from the viewpoint of the regulator system earnings regulation is essentially the end of the process of income reimbursement (that is, whether the wage paid is reimbursed in job performance), but from the side of the individual it is the beginning of the incentive process. The meeting point is the incentive-interest system operating as a part of the internal enterprise mechanism. And without a close examination of the latter to debate earnings regulation--thus in general--is a most risky and for the most part senseless undertaking.

And here we have a new theme for debate: To what extent does the more generally valid earnings regulation influence the internal interest system of enterprises--to what extent can it influence it at all? If you please: Has the reform of wage regulation, which can be judged more significant than any before, stopped at the gate of the enterprises? Yes and no. There are places where very noteworthy changes have been made in the internal interest system--and in an enterprise area which cannot yet be appraised. The revival and spread of a single sum wage draft seems characteristic. At one machine industry enterprise they speak of this as an undertaking in main work time. They are urging incentive methods concentrating on quality work, premium tasks are defined much more carefully, and last but not least, there is a more vigorous earnings differentiation adjusted to performance requirements that are stricter than before. But it is also characteristic--as we mentioned before--that due to the constraint dictated by the wage competition they are using all the money which can be mobilized to raise wages. There are those who, because of this enterprise practice, even dispute the justification for the uniform interest fund. Use of the wage reserves accumulated earlier, concentrating on this year, is characteristic. As a result of this, the enterprises operating according to strict central regulation have achieved wage increases of almost 4 percent instead of the predicted 2.5 percent. And of course it is also characteristic that the supports content of enterprise profit is still high despite all the central efforts in connection with this. That is, instead of the so much desired strictness and carefulness in connection with the supports system the practice is rather one of careless liberalism. This in itself can considerably confuse the purposeful functioning of earnings regulation.

So--making a quick survey of the new type of earnings regulation--what is the final result? Is it only negative? Is it a debatable step forward of dubious value? No. Even those who dispute the justification of an earnings regulation which continues to be isolated and, as they say, not "conforming to the reform," agree that this form of regulation does represent noteworthy progress compared to the earlier methods. Because there has finally been a break--with the introduction of level regulation--from the base interest which was maintained rigidly for decades and which earlier seemed inviolable. Because--again in the case of level regulation--the average enterprise wage is finally not "sacrosanct." Because the enterprise is not interested in enlarging the

so-called padding personnel, i.e. in holding on to low paid workers because of the established average wage, and because it is finally possible to mobilize the personnel reserves and--if only in a way--to mobilize the performance reserves as well. And because the internal interest system has finally moved and changed, even if only in a narrow circle of enterprises, and because undeniably more rational considerations characterize enterprise manpower management also.

We have been hoping for all this from the wage or earnings regulation system for years, for decades. Indeed, we have been hoping for more, for the initiation of even more radical processes. For the time being--with the passage of 10 months--we have gotten this far. Can we get further if the earnings regulation which has been operating barely 10 months is anxiously debated in certain circles? What can be done and by whom with an evaluation--unnaturally combining the most varied professional positions--according to which the regulatory scheme has proven itself and will remain while changes to avoid future problems must be made in the system of magnitudes, although one might also consider whether this sort of earnings regulation sufficiently strengthens--in accordance with its intended goals--the earlier neglected incentive function?

As a personal observation let me say only that I wonder at the patience of the wage regulation experts. They have done everything for the cause, but whatever they do, someone somewhere doesn't like it. And as for the professional debates, they do not say it, they never suggest it anywhere in any form, but still one suspects that while they are forced to do battle with economic considerations--with felt or real rationality--still their entire work is guided by certain social policy "expectations." And is it that they do not understand why others do not understand this too?

8984

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HUNGARY

BACKWARDNESS, LACK OF SKILLED WORKERS IN MACHINE INDUSTRY

Budapest NEPSZABADSAG in Hungarian 3 Oct 85 p 6

[Article by Sandor Gyori: "Wandering in Mechatronics--Hungarian View of the Hannover Machine Tool Exhibition"]

[Excerpt] ...Deputy Minister of Industry Andras Gabor:

"In our country, unfortunately, that process of the historical transformation of machine tool manufacturing which is taking place in the developed West, has so far been lagging behind the times. I am thinking first of all of coupling our products with electronics, or even more comprehensively of the electronization of production and of the system of material processes, of improving measurements. It is also practical to muse about the way the world market concepts change; the production rejuvenation took place over there in the very years of the crisis."

Doesn't it seem that this strategy is the opposite of the domestic practice?

"Yes. The reorganization is radical, multi-level at our traditional partners such as the FRG. Here is the example of the Gildemeister firm, one of the internationally recognized leaders of this branch. This enterprise in Bielefeld was able to "escape" forward at the low point of the business cycle with its vigorous concentration of the capital, bought up the bankrupt small companies with profiles similar to its own, and at the same time built up its independent electronic support industry. This latter is a requirement commanding a vision, an indispensable necessity of the additional performance necessary for survival, and at the same time it is a key element of gaining an advantage. But in our country the necessary rapport did not develop either among the manufacturers or the EMC [Factory for Electronic Measuring Instruments] and the Vitali, which provides the potential electronic support industry; the same is also true for the lateral relationships among the former"--the deputy minister says and adds: "The financial resources for development are weak and limited, which is reflected in the mechanical conditions of our factories."

Even though every sign indicates that in the process of mechatronics, that is, the integration of mechanics and electronics into one system, even the Western firms with strong capital cannot succeed without state assistance.

Education in Key Role

The Hungarian expert who warns of the danger of making electronics into a fetish or possibly misinterpreting it, appears to be moving against the prevailing winds:

"We may be disarming ourselves by carrying this view into extremes"--he says.--"The independent electronics background is a question of not so much the capital as it is rather of the software people who can see beyond their own professions and who think exclusively for us."

And of course it is the question of the workers who understand and adapt the digital language of machine control. The large western European and Japanese enterprises automatically place the machine tool employee at the beginning of his career, but if necessary also yesterday's traditional lathe and milling machine operators in classrooms and with the help of the so-called control simulator teach them everything about handling the real CNC control equipment in the workshops. The fact is that the new type of employee trained on Commodore or IBM personal computers and video equipment is a serious advantage in the competition.

"If we do not urgently adopt the new training techniques, if we do not learn and teach people to think in terms of systems, catching up will remain a mere illusion"--says Miklos Tombacz, department head at the Ministry of Industry.

According to Gyula Barbaro, main department head of development institute of SZIM [Machine Tool Industry Works], also the Achilles-heel of the whole matter is the lack of trained technicians. What he says after this still has the effect of a confusing paradox:

"I don't know what will happen to us once those born in 1930 retire."

He is so concerned about the future of the Hungarian machine tool production which has at one time seen better days that it does not even occur to the questioner that perhaps prejudice for his generation would motivate his words. Even that supports the foundation of his judgement that the demanding--under the circumstances--M.-403 the SZIM exhibited is guarded not by young technicians in their twenties and speaking several languages but by middle-aged main department heads.

I ask him what the essential difference consists of in his opinion between his own enterprise, the Hungarian machine tool industry and the leading Japanese and western European firms. His answer:

"First of all speed, the flexibility of reaction, secondly the reliability, the quality, and finally the price."

"What do you mean by this latter?" I asked.

"That we produce this same technical performance at a much higher price."

"Quality and reliability can be achieved exclusively with superbly trained and conscientious technicians. And quality and reliability are two basic requirements without which one cannot succeed on this market either. Let us just take the example of the MC-403. This is a CNC-controlled three-axis processing center with extremely high productivity due to the concentration of the operations. If someone buys this, inherently they become dependent on us to some extent since they could suffer severe losses even in the case of the shortest malfunction or breakdown. Of course the dependency is mutual as it risks the prestige and future opportunities of the Hungarians and in general of all the manufacturing firms."

Symbolic Happenstance

This is the way Istvan Erdei, director general of the "neighboring castle", the Caspel Machine Tool Factory summarizes his opinion:

"We can see that the high Western requirements are not the buyer's whim but general requirement. It is forced on us by the sharp competition and the large volume of oversupply. Hannover was educational for us because we see that the tendencies we knew even before are gaining strength. Due to what we learned at the exposition we will improve and perfect the machines we are now exporting."

The director general is a realist and emphasizes that under the present restrictions on the Hungarian machine tool manufacture it would be expeditious to decrease the size of the market we wish to win. He calls attention to that now rather significant viewpoint that our machine tool industry could improve our trade balance at least with the socialist countries.

I have very seldom met such creative criticism as in the case of thinking of the Hungarian experts who went to Hannover in regards to their judgment. Their demand that the technology gap should not widen, that we should catch up on the world market, is even more logical since machine tool manufacture is commonly known to be one of the leading branches of industry. Those who say yes to this are casting their vote for the future.

8584/7687

CSO: 2500/32

HUNGARY

SHORTCOMINGS, INEFFICIENCY IN COAL PRODUCTION DISCUSSED

Budapest NEPSZAVA in Hungarian 21, 22, 23 Oct 85

[Series by Erno Ban: "Whither Coal Mining?"]

[21 Oct 85 p 4]

[Text] Shock Work and Losses

For the third year, coal mining has not met its goal. The shortfall was 600,000 tons in 1983, 700,000 tons last year and is expected to be several hundred thousand tons this year. This has caused tensions primarily in satisfying the needs of the population, which could be met only with the import of 1.7 million tons of coal. The coal need of the national economy by the end of the coming 5-year plan will be 26-27 million tons per year. What will coal mining be capable of--with ever decreasing personnel and with investments smaller than what was requested?

Director general Dezso Kiss is pessimistic about the future of the Borsod coal basin. In 1982 they still mined 5 million tons of coal; their plan for next year is less by 900,000 tons--due to the exhaustion of a few shafts and the decreasing personnel.

"We might ease the drop in production only by establishing the new, Dubicsany mine. This would cost 7 billion forints, give 2 million tons per year after 1993," the director general explained. "We asked for 3.5 billion for investment up to the end of the next plan period. It looks like we will get only 940 million."

"What is this money enough for?"

"Essentially for a slower tempo. Our production will probably decrease to 2.6 million tons by 1993. We must face this fact now."

"Last year you closed the year with a deficit of 130 million. This year it appears the deficit will be half a billion. Were you losing money earlier?"

"No. In the past 4 years we paid more than one billion forints into the common purse of coal mining. Last year it was 260 million, giving us the shortage of

130 million. They expect us to be profitable, but we are not to say how much we can extract economically at the present officially established coal prices. If we could decide and if we mined only the thick deposit coals we could be profitable even with such depressed coal prices. But then we would bring 1 million tons less coal to the surface. This year we are losing 109 forints on every ton of coal. In addition, our personnel have decreased recently by more than 1,000 people. If this trend continues we are heading for bankruptcy."

Who Stands His Ground?

Lyukobanya fulfilled its 5 year plan on 20 September. They have been working for years in a regular way. The average wage of the underground diggers, counting extra shifts, is 140,000 forints per year; that of surface miners is 70,000. How did they differentiate this year with a 7-percent wage development, higher than the industrial average? I am told that the diggers got a 7-percent wage development, maintenance workers got 5 and the "tradesmen" working on the surface got 12 percent. The latter got more because they hardly got any raises in earlier years. This had to be supplemented so that they could compete with the drawing power of surrounding factories.

Janos Kassai, a metal worker group leader, has been working at the mine for 30 years. His base wage, after the 12-percent increase, is 5,100 forints, plus the group leader supplement and loyalty money, which is 9 percent. We talked in the preventive maintenance shop.

"My son-in-law is also a maintenance metal worker, at the Lenin Metallurgical Works, and he earns more than I," he said.

"Did you ever think of leaving?"

"A man cannot change jobs at 53 years of age."

Last winter the bitter cold demanded more coal from those at Lyukobanya too. The shaft leaders were forced to put even those working on the heading onto the coal wall. So they got behind with preparing the new front wall. In order not to endanger the future they organized shock work during the summer. Zoltan Ivaneso, chief of a heading team, and his brigade drove 519 meters in July--a record. We talked in the operations office.

"How do you see the future of mining?"

"No way," he retorted. "Today, when the order of values is so distorted, no one should be surprised if only a few agree to go underground."

"How much do you make per month?"

"My base wage is 4,550 forints. With shift and other supplements--doing a full 100 percent--I earn 7,500-8,000 forints per month. If I go down in the mine on my days off my gross pay can reach 14,000-15,000 forints. My older brother is a miller for DIGEP [Diosgyor Machine Factory], permanent morning shift, works 4 hours a day, and he earns well over 10,000, not to mention that the sun shines through the shop window. I have 4 1/2 years to retirement. I would like

to last till then. But what about replacements, who will cut coal in our place?"

Delays and Losses

They mined 3.5 million tons of coal in Tatabanya in 1964. But it could be calculated that by the mid-1980's the mines would be exhausted. This year they still brought 300,000 tons to the surface; next year they will bring up the last 160,000 tons.

At the same time, in the vicinity, in Nagyegyhaza and Many, they have opened up or partly surveyed about 250 million tons of coal beneath the surface. In 1977, after the oil price explosion and on the basis of a government resolution, they began to deepen the Nagyegyhaza shaft as part of the Eocene Program. This year they should have produced 1 million tons of coal but were able to produce only 980,000 tons. What are the reasons for this? I asked Lajos Pekete, director general of the Tatabanya Coal Mine Enterprise.

"We began the settlement work about 5 years late, but because of the increasing coal shortage we were forced to move up the opening of the mine. This was possible only with emergency solutions. And these are coming back on us. One problem breeds others."

"According to the Eocene Program a mine should have been opened in Many too. How is that going?"

"We started work in 1979. Several hundred millions were spent on foundations for the power plant when they stopped us in 1980, construction of the power plant was scrubbed. A year and a half later we got the opportunity to continue work on opening the mine, but in stages, and in the first stage we will be producing only 780,000 tons by 1988 instead of the 3.8 million tons planned. We lost a year and a half. This area is not opened up enough, either, not enough galleries. This year we will produce 100,000 tons at Many."

Loan Must Be Repaid

"You are getting a state loan totaling 11.1 billion forints to build the two mines. When does this have to be repaid?"

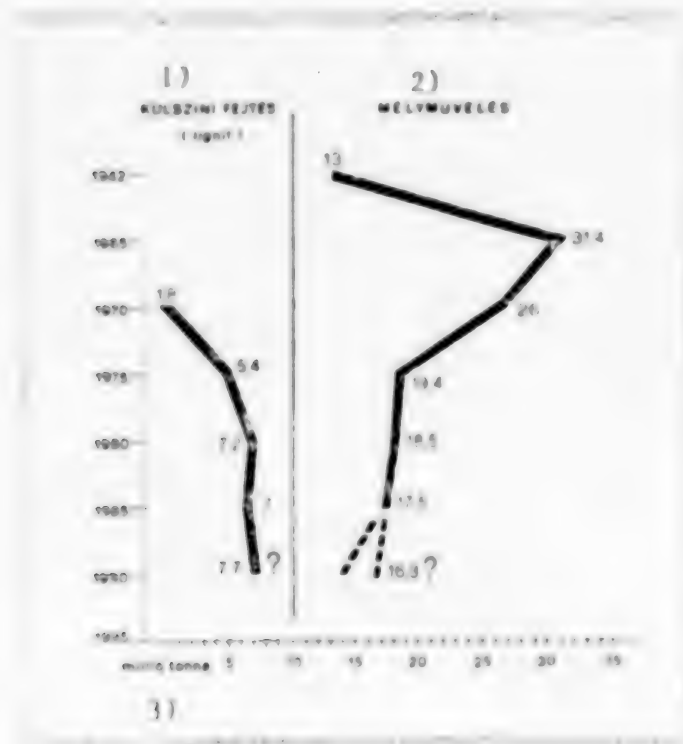
"In 15 years. This year the interest was exempted. So we have to pay back 700-800 million forints per year, although the production of the mines is not yet up to the mark."

"Can you pay it back?"

"That is questionable. The average production cost for coal is 1,768 forints per ton, and the officially established sale price is 1,284 forints. But this is not our only problem; the other problem is that our labor personnel is dwindling at such a rate that in 10 years there will be no one to dig coal."

"How do you differentiate with the performance wage, which is 2 percent higher than the planned industrial average?"

"We raised the norm base wage of those working on the coal wall by 8 percent; in addition we pay 2.50 forints instead of 1.50 forints for every ton of coal produced and we also provide an extra sliding wage scale. Those working on the surface got a 5-percent wage increase. It is also true that we raised the wages of those directly supervising production and working underground in 3 shifts by 13 percent--this affects 150 men--so that their earnings will gradually approach the average wage of the miners supervised by them.



Key: 1. Surface Mining (Lignite)
2. Deep Mining
3. Millions of Tons

[22 Oct 85 p 4]

[Text] Measures of Efficiency

I last visited Nagygyhaza 3 years ago. Even then they were not meeting their goal. Istvan Veszpremi, brigade chief and Hero of Socialist Labor, said then that the best brigades had been transferred here when the mine opened. Everything went well for 2 months. Then they found themselves up against previously unknown geological difficulties. However they tried, even at the cost of the greatest physical effort, they could not make up the deficit.

"They Raped the Mine"

Unsuccessfully I looked for the brigade chief. A year and a half ago he was crippled and got 100-percent disability. I looked up my other former report subject, front master and brigade chief Jenő Csente, down in the mine. The hauling shaft shrank so that one could reach the front wall only bent over, crawling.

We edged out into the air shaft. I had last seen Jenő Csente on television, as he spoke at the 13th congress, representing the miners. Now he is tired, worn out.

"We drive as long as we have strength, but it doesn't go as we would like, but it is not we, the miners, who are the cause of it," he said passionately. "The truth is they raped this mine. They had to have coal. There was no preparation or driving drainage shafts, and we are forced to use a method of cutting which shouldn't be permitted in such a wet mine.

"They are asking the impossible from us," he continued after a while. "At the same time the miners do not get the respect they expect. They want to cut back on deep mining. They did that once already and then it turned out that they still had to have coal. In the past 2 months I have worked 35 extra shifts and I will go underground everyday until the end of the year. I just don't know how long I can take it physically. There are no replacements. Where will this lead?"

Old Ideas

In 1964 they brought 4.4 million tons of black coal to the surface from the Mecsek Coal Mines. This year only 2.6 million tons. We talked about this with Emil Merei, director general, National Assembly representative for Komló and a member of the industrial committee of the National Assembly. The director general emphasized by way of introduction: "The switch to hydrocarbons in the mid-1960's broke for us also the development which had characterized coal mining up to then and manpower began to move away. Since the mid-1970's, when the role of solid fuels increased again, the economy has been asking us for more coal. Meeting the tense short-range production requirements was possible only by exhausting the reserves. At the same time we did not have enough money to replace the machinery.

"After exhausting the reserves the production curve goes down. The government measures thus far to stop it are worthy of respect but they are not enough," the director general said.

"And the Lias Program?"

"Where are the original plans now? According to the plan we were originally to get 13 billion forints for it in the Seventh 5-Year Plan. According to a later plan only 8 billion. Now it looks like only 4 billion."

"What will this be used for?"

"To slow down the decline. By the end of the decade the production of our deep mines will probably decrease to 1.67 million tons, that of the weaker quality bordering surface mining will increase to 550,000 tons. But it is to be feared that we will not be able to mine out even this much. At the beginning of the 1960's we had 20,000 coal workers and now we have half that. In 1976 there were still 3,986 diggers cutting coal, now only 2,090, and their number is still decreasing. The proportion of our miners crippled at work is rapidly increasing and reaches 11 percent of the labor personnel."

Contradictory Goals

Much is said today about enterprise independence, the price regulating role of the market and eliminating uneconomical products. According to the director general the line demanded by normative regulation suits, for example, the Pecs Leather Factory, which could switch overnight to the manufacture of other free price products which could be sold more economically. But they can produce only coal in the Mecsek, and the prices are officially established. For example, the average production cost of deep mined coals is 1,573 forints, and they must sell it for 1,289. Last year their deficit was 450 million forints, this year it is expected to be 600 million.

"They will have to decide," the director general said, "what standards to use to regard domestic coal mining efficient. With the domestic prices, which ignore expenditures and the price of coal imported from the world market, it is not certain that unprofitable enterprise production is also uneconomical at the national economic level. The double nature of guidance presents us with insoluble dilemmas. It is impossible to decide whether the primary goal of the enterprise is production, satisfying the needs of the economy and the population, or increasing efficiency, profit. The two goals cannot be met at the same time, so they must decide which is primary for coal mining on behalf of the national economy...."

Tight Situation or Not

In Komlo we talked with fewer Imre Radics after the election of trade union stewards. He said that he had participated in the conference of socialist brigade chiefs of the Mecsek Coal Mines and was surprised by the report of the Minister of Industry. He pulled his notes from his pocket: "... there is need for a structural change in mining, the economy must have coal which can be produced economically. The ratio of deep mined coal must be substantially reduced in the next 5-year plan.... This will affect the Mecsek Coal Mines also," he quoted from the notes. "The minister said," he continued, "that the economy is not in a tight situation in regard to coal supplies. If necessary the missing amount could be bought on the world market at any time for dollars, and other industrial and agricultural operations will produce the foreign exchange. So we coal miners are in a competitive situation. But there is something I don't understand," he ruminated. "There is nothing else in the papers and on the radio but that capitalist export is not going as we would like. So what is the guarantee that we will have foreign exchange for coal? Many have asked me--What is this, do we want to heat with ham?"

[23 Oct 85 p 4]

[Text] Shortage of Personnel, Most Serious Problem

According to information received from the Ministry of Industry coal mining can probably count on an investment level of 21.1-21.6 billion forints for the period of the Seventh 5-Year Plan, while total annual coal production, according to the thinking, can be kept at about 24 million tons, within which the annual volume of surface mining lignite production will increase to 7.7 million tons by 1990.

Will coal mining be capable of satisfying the national economic expectations at the end of the decade? We talked about this with Istvan Tamasi, director general of the Coal Mining Association.

"As is well known mining is a branch of industry which requires capital and time," the director general said. "Measures taken to develop or reduce it are felt even after 10-15 years. After the liberation, for example, we developed the branch vigorously, its production increased from 13 million tons in 1942 to 31.5 million tons in 1964-1965. Development came to a halt because of the switch to hydrocarbons, and a decline began. Ten years later we mined 12 million tons less brown and black coal and by the end of the Fifth 5-Year Plan we were producing 17.5 million tons. At the same time we planned to increase the production of surface lignite to 6.5 million tons by 1980."

Intended as Temporary Solution

"What happened after the oil price explosion?"

"That presented us with a difficult task. We had to stop the decline and increase production. But the coal needs--especially those of the population--increased so suddenly the reduced branch could not prepare for it--being oriented primarily toward energy coal. At the same time, in the period of the Fifth 5-Year Plan, they asked us for 4.3 million tons more coal than we had planned for originally. The miners exceeded this demand, they provided the economy with a total of 6 million tons more coal, which at the prices then made it possible to save hydrocarbon imports worth 300 million dollars."

"How was it possible to get 6 million tons more coal out of the underdeveloped mines?"

"With extraordinary measures. We began surface mining of emerging deposits on the borders of the mines. We got 3.1 million tons of coal from that. Because of the declining number of workers--and despite the rising level of mechanization--we were also forced to send the miners underground on their days off. Thanks to their readiness to sacrifice we got another 3.2 million tons of coal. We intended these emergency measures as a temporary solution at the time. We hoped that the capacity of the new mines coming in as part of the Eocene Program would have a favorable effect. But these shafts are coming in late."

"After this, how much coal did you plan to produce in the Sixth 5-Year Plan?"

"We started from the volume of coal mined with the emergency solutions. So we planned for 25.7 million tons in the first year and somewhat less thereafter," the director general said. "But beginning in 1982 we were forced to increase this, since they asked us for 2 million tons more coal, in accordance with the needs of the economy. For two succeeding years we overfulfilled this by a few ten thousand tons, but in 1983 and last year we could not meet the increased plan, despite the fact that the miners produced 4.4 million tons in 4 years on their free days and we got 5 million tons from frequently uneconomical border surface workings."

No Cheaper Energy

"What caused this?"

"Many factors. For example, the increase in the withdrawals, the wage increases, the increase in contributions, in transportation costs and in material prices. The burden of stripping ratio and costs of the surface workings increased greatly. The wages of the foreign guest workers who were used to counter the loss of personnel have increased production costs by 10 percent. If we were to adhere strictly to the striving for profit of the present normative regulation then domestic deep coal mining could undertake to produce only 9 million tons. Even with the preferences offered in the income regulation system the maximum would be only 18 million, together with the 6.5 million tons of lignite from the Visonta and Matraalja surface workings. The country would not be able to replace this lost production with another cheaper fuel today, not to speak of the fact that such a reduction is not justified on the basis of the criteria of cost-effectiveness interpreted at the national economic level. Domestic coal represents the base for the production of the domestic electric power industry. Although the coal power plants were built longer ago than the new oil and gas burning power plants their efficiency is worse. Energy produced here costs 30 fillers more per kilowatt hour than in the coal power plants. In reality the difference is even greater at the national economic level, because if it is obtained from the capitalist relationship the cost of electric power fuel would be 70-80 fillers more expensive."

"And yet they say that coal mining just eats up the money."

"I do not agree with this," the director general protested. "However incredible it sounds, the balance of coal mining was positive between 1981 and 1984. If I subtract the support which the state gave us, we paid 11.8 billion forints into the budget through the various complicated withdrawal channels. They did not support us; at most we did not contribute as much to the receipts of the budget as they expected."

"This year you are figuring on a 1.7 billion deficit instead of the 2 billion profit planned in 1980?"

"Yes. But the reason for this is that the production costs increased to a greater extent than the coal prices. Our average costs today are 1,004 forints. At the same time the officially established average sale price for coal is 885 forints. Under these circumstances it is unrealistic to ask that

we be profitable and self-financing, and for 15 years we will be paying back the billions invested in mining, although free of interest."

"What is the world market price of coal now?"

"As I understand it the coal types are not posted on international exchanges--except for metallurgical coal. So one cannot speak unambiguously of a world market price. But if I collate the western contracts for this year--and recalculate to calorific value, to GJ--it turns out that the imported coal costs an average of 150-170 foreign exchange forints per GJ, as opposed to 92 forints for domestic coal."

"They expect 24 million tons of coal from domestic coal mining by the end of the next plan period. At the same time, 22 of the 42 shafts will be exhausted. Some of their machinery is already written off to zero."

"This is true. This is why the coal mining enterprises counted on at least 32 billion forints for investment and development in the Seventh 5-Year Plan, but it looks like they will get 10.5 billion less. This is too little to maintain the present level of the deep mines. Our production will obviously decline by 1990. A study to make increased use of the lignite base to replace coal is under way, in order that we might satisfy the economy's expectation of 7.7 million tons by the end of the decade."

The expected development, to 1990, of the personnel, work time and performance trends of the Coal Mining Association was in front of me. Taking the personnel decrease of the preceding two years as a base, the trend indicates that coal mine personnel will decrease from the 50,673 of 1984 to 44,733 by the end of the decade. Another statistic is even more alarming--underground personnel, primarily diggers, will decrease precipitously, from about 13,000 this year to 9,000 expected by the end of the decade. Returning to the trends of the Coal Mining Association, it turns out that the per capita production of coal mine workers in 1984--counting days off--was 443 tons. If I multiply this by the number of personnel expected in 1990 then coal mining will be capable of producing a total of 19.8-20 million tons of coal, and not the 24 million tons expected.

Develop or Cut Back?

"The shortage of personnel is the most serious problem for tomorrow. Such a large decrease could not be made up for even with the most modern techniques--if there was money for it," the director general said. "We trust that the Council of Ministers' resolution passed in the spring will be implemented in the shortest possible time, that the stressed nature of coal mining, of greater magnitude than the industrial average, will be dealt with in a complex way, and that mining work will thus be awarded its social rank. Only in this way will we be able to stop the migration, replace the aging diggers (their average age is 42 years) with new ones and replace the missing labor personnel. In the contrary case we will be forced to an ever increasing import of coal in the years ahead."

So where is coal mining going? According to one position this branch must be developed because our coal reserves are ample while domestic petroleum and natural gas production will decline in the coming decade. We should not burden the national economy with having to import extra fuel for several hundred million dollars per year. Others, however, feel that we should invest in the processing industry instead of in coal mining, should produce and export products which are competitive on the outside market, and import fuel for the foreign exchange thus obtained.

A question arises in connection with the latter idea: What is the guarantee that industry will be capable--with the money taken from coal mining--of increasing its export to such a degree that it can provide the additional hundreds of millions of dollars for an increasing import of fuels in addition to reducing the outstanding debt?

The questions of coal mining must be answered.

5984

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POLAND

DEPUTY CRITICAL OF SYSTEM OF ECONOMIC ADMINISTRATION

Warsaw ZYCIE WARSZAWY in Polish 24-25 Aug 85 p 8

[Professor Alojz Melich, a deputy of the Sejm's 8th Term of Office, is interviewed by Ryszard Czerniawski: "It Won't Take Care Of Itself"]

[Text] In the columns of "The Law and Your Life," Ryszard Czerniawski interviewed Professor Alojz Melich, a deputy of the Sejm's 8th Term of Office. Here is what the professor had to say:

"The control system is one of the weakest elements of the economy. It seemed to us that all we had to do was to eliminate the elements of central control and planning, and give the enterprises complete freedom in their activities and everything would take care of itself. This is a falsehood. There is no direct command connection in the current operating system, but there is a connection through the parameters and indicators which are supposed to define the framework of independent activity on the part of the enterprises.

"This framework has to be set up efficiently, otherwise the economy would function erratically and consume great amounts of capital. Thus, we should demand a very strong control mechanism for the economy. This is something we have never had. Previously, we had a bureaucratized system; today, it is an atomized center (...)

"I believe that the new Sejm will have to work out legislation for the organization of a central authority (...). We are not only talking here about the central system itself, but also about the organization of all central institutions operating within the economic sphere. What are we to do with the industrial branch ministries? Are they necessary? How do we harmonize the activities of functioning ministries so that they all move in a single direction?"

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CZC: 2609/1067a

POLAND

COMPUTER EXPORTS TO CEMA NATIONS

Warsaw RZECZPOSPOLITA in Polish 21 Aug 85 p 4

[Article by (z): "Computer Exports: From Zabrze To The Markets Of The CEMA"]

[Text] The ComPAN-8 is the success of the year. Cooperation is achieved with Soviet specialists and Avans makes the "500 List."

It may be the product of the year. Production of the ComPAN-8 Professional Microcomputer has begun in the Mera-Elzab Computer Equipment Plant in Zabrze. This microcomputer will be particularly useful in facilitating engineering computations, assisting operational efforts in technological processes, and helping in medical diagnoses, the automation of scientific research [e.g., recording the course of experiments and the processing of their results], etc.

The ComPAN-8 is the brainchild of a joint technical idea on the part of engineers from Zabrze and scientists from the Polish Academy of Sciences. The next 5-year period will see the production of 3,500 units of this computer. In addition to Polish contractors, all CEMA countries are also interested in purchasing the computer.

Mera-Elzab is known in all CEMA countries for the production of monitors, screen monitor systems, printers and personal and profession computers. This year's exports will amount to 3.5 billion zlotys. At the Poznan Fair, a contract was concluded with a Soviet buyer for the delivery of 60,000 monitors and monitor systems worth 200 million rubles. The delivery period is 5 years. Subsequent contracts are already being prepared.

A journalist from RZECZPOSPOLITA was at Mera-Elzab and interviewed Chief Engineer Zygmunt Korga, the deputy director for sales and technical matters. The first question had to do directly with exports. A large amount of the production in Zabrze is also installed in equipment exported mainly by Elvro in Wroclaw.

The chance for exports on the part of the computer producer in Zabrze lies primarily in the Mini-Electronic Digit Machine System (MEMS). This system is operational in all CEMA countries. Polish monitors can interface

with every computer produced in the Soviet Union, Bulgaria and the German Democratic Republic. The same is true for so-called software, printers digit memory, etc. The Council of Chief Engineers of the CEMA and many key commissions supervise production in detail and turn out the kind of code material which is operational in the uniform systems of the CEMA.

With regard to mini-machine systems, the products from Mera-Elzab are in the European forefront. Any differences in the technical level here are relatively insignificant.

Instruments from Zabrze are produced in close cooperation with Soviet specialists from the Elektromasz plant in Kiev. Elektromasz is the largest buyer of Zabrze's products. For instance, production was begun in December 1984 on a new type of monitor: the SM 7222 is currently being used in Soviet institutions and contracts were concluded already in the spring of this year for delivery of several hundred units to the Soviet market.

Exports are particularly important for the plants. Thanks to these exports, wages are finally competitive. What this means for Silesia does not have to be explained. Today we have a situation in which people want to work "in computers."

For the first time, Mera-Elzab is on the "500 List." True, it might be 498th on the list, but as Director Kurga stresses with pride, the firm is in third place in earning capacity and worker productivity at the firm ranks 16th. This is encouraging to the work force.

Much is promised for the Zabrze computer producer with the advent of the COMPAN-8 micro-computer. Production of the 8-byte computer has hardly begun and work is already beginning on an enhanced 16-byte computer with replaceable electronics. The Meritum II micro-computer with memory discs is entering production in September; it is the newest representative of the Meritum line of personal micro-computers.

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POLAND

LAND USE MANAGEMENT COUNCIL FORMED

Warsaw RZECZPOSPOLITA in Polish 1 Oct 85 pp 1, 5

[Text] In accordance with the law on land use planning, the State Council for Land Use Management has been created, reporting directly to the premier. The opening meeting of the council and its formation through the submission of nominating documents took place on 30 September.

Congratulating the members of the council on their nomination, Deputy Premier Manfred Gorywoda, chairman of the Council of Ministers Planning Commission, stressed the importance attached to their work in the period of the establishment of the socioeconomic plan and the guidelines of the long-range plan. The end product will be the final assumptions of the national land use management plan through 1995, i.e., a long-term plan defining the goals and principles of state land use policy and the activities of its organs.

During the discussion, certain shortcomings in the proposed assumptions of the draft plan also were brought to light and dangers in the implementation of land use policy were noted.

Deputy Chairman of the Council of State Kazimierz Secomski was elected chairman of the State Council for Land Use Management.

Marian Wozniak, member of the PZPR KC [Central Committee] Politburo, first secretary of the PZPR Warsaw Committee, participated in the meeting of the council.

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POLAND

LEATHER INDUSTRY SUFFERS HARD CURRENCY DEFICIT

Warsaw RZECZPOSPOLITA in Polish 22 Aug 85 p 4

[Article by (kos): "The Leather Industry Is Searching For Hard Currency: More Exports, Fewer Imports"]

[Text] Enterprises, belonging to the Association of Leather Industry Enterprises and producing footwear, pelts, clothing, leather gallantry and other items made from skins, utilized crude skins, dye-stuffs, tans and other imported supplements in their production efforts last year, and purchased machinery and spare parts for a combined worth of approximately 140 million dollars. The exports of these enterprises amounted to a sum of 75 million dollars; the foreign exchange balance of the leather industry was thus very negative.

From 1 January, the leather industry has introduced an experimental program in which production centers, belonging to the association, units unified in the Association of Enterprises Buying and Selling Textile and Skin Materials, and the THZ Skorimpex Firm are participating. According to Franciszek Sitkiewicz, the deputy director for economic and developmental affairs for the Association of Leather Industry Enterprises, a gradual increase in exports and a simultaneous restriction in imported materials are envisioned. The plan is for expenditures and revenues to be equal by 1988.

The implementation of the program begins with the covering of domestic market requirements and deliveries to other socialist countries. Only in the third phase would things really begin to move properly with exports and hard currencies. Inasmuch as producers, who want to increase their exports, are forced to meet the high demands made by foreign buyers, while at the same time trying to provide the domestic market with the best products, there will be an additional benefit: the leather industry will cease taking hard currency from the state's coffers.

How are the planned results going to be achieved? Director Sitkiewicz makes the point that not only were there producers of finish products in the association, but also tanners, who work with raw materials, and producers of various supplementary materials (like hoofs and other by-products), spare parts and auxiliary instruments, which are used in the

finishing process. Inasmuch as the coordinator of all activities is the association, joint pro-export and anti-import plans can be undertaken and implemented.

It is for this reason that a joint development fund was set up, from which monies will be earmarked for the purchase of technology and machinery needed by the entire industry. However, the main exporters did keep their own lists of suppliers and contacts, independent of the joint development fund. The program also includes the trading firm, Skorimpex, which ensures the implementation of the plan in its final phase: sales.

Recently, a number of actions have been undertaken which aim at reaching foreign exchange self-sufficiency. The Central Laboratory of the Footwear Industry organizes twice yearly an evaluation of the pattern-designing of envisioned collections. Working with chemists has led to the production of several tanning materials and dye-stuffs, previously imported from capitalist countries. Looking at the domestic market and into the future, exports will see the development of pre-formed footwear with the soles of this footwear made from a material new to Polish industry: semi-plastics.

12247/9190

CSO: 2600/1067a

POLAND

FARMING AND FOOD INDUSTRY INSTITUTE DIRECTOR ON REFORM

Warsaw RZECZPOSPOLITA in Polish 27 Sep 85 p 3

[Interview with Prof. Dr. hab. Augustyn Wos, director of the Institute on the Economy of Agriculture and Food Management, by Ludwik Staszynski; date and location of interview not specified]

[Excerpts] Today we are publishing the second half of an interview with Prof. Dr. hab. Augustyn Wos, director of the Institute on the Economy of Agriculture and Food Management.

[Question] There are those that say that because the reform is not checking out here and there, we should steer towards directive planning.

[Answer] In my opinion, this suggestion is totally false. Here and there the reform does not check out because the habits of directive planning and management are too deeply ingrained within us--in people, in the decision-makers at various levels, not only at the national level and not primarily at the national level.

Conditions have changed but often our thinking continues to remain the same. The situation today is a new one, but we continue to believe that everything that is not done centrally is a yielding to authority. But to whom? Many of our decisionmakers believe that if they do not decide something, there will be no progress. I believe, however, that the less a minister engages in "steering by hand," the better he performs his functions. In other words, he controls the general situation. On the other hand, growth cannot be steered by hand, the economy cannot be steered by hand, for in this way both oneself and the entire society are deprived of the results of initiative that arises because people are granted the possibility.

What good is it if we set in motion central funding while we lose a tremendous amount because of a lack of interest and responsibility at the bottom? This is just that philosophy. I think that in general our discussion here shows that certain philosophies are in error and must be rejected. This is also a social process. We know very well that the greatest obstacle lies in people, i.e., in their consciousness, in certain stock notions that if a decision is not handed down at the ministry level, this means that no decision is forthcoming. It is.

[Question] Sometimes a decision is expected from the so-called higherups even at a session of the gmina [parish] people's council with regard to various trifling matters that the council itself should resolve.

[Answer] Such helplessness is also a social fact. It is a consequence of the old system. We do not expect the reform to change everyone like a magic wand. Perhaps a great deal will not change at all, because it is too deeply ingrained in old systems and ways of thinking to be able to change. But there is no turning back from this; it is simply a social process. And as you state correctly, it is a process that is taking place in all socialist countries.

[Question] Professor, as I see it, a big plus of the variants of the concepts of the plan was the fact that they were submitted to society for extensive discussion and that everyone had the possibility of stating what he thought on this subject. How do you assess the results of this discussion?

[Answer] Social discussion includes an element of the openness of political life. I would treat this as a certain form of realizing democracy. A certain partnership is demonstrated by this. However, if this is a form of social consultation and if social consultation is to be real and to give satisfaction to both sides participating in the dialogue, then the citizen must have a choice. He must realize what he has to give up in order to get something, since it is impossible to obtain many things immediately under present circumstances.

[Question] The discussion of the variants of the proposed five-year plan has unearthed something that may be defined as a parochial viewpoint. There has been a sort of elbowing of others.

[Answer] I too have noticed this with alarm. As people active in agriculture and involved in these matters, we also have been accused of ministerial parochialism or some such thing. Most definitely, it is an important and very fearful social phenomenon. The economy can be killed in the name of implementing some sort of parochialist goal. Parochialism most likely emanates from the fact that we do not comprehend the ties between the implementation of general and individual goals. That is why it seems to some people that if they squeeze out a larger amount of funds for, let us say, some sector of the national economy, things will be better in general. But this is not at all the case. When we "pump out" funds for a particular goal, this may mean that the balance is destroyed elsewhere. It also may cause a somewhat delayed weakening of the development of a subsector that claims special preferences.

Whoever has the greater penetrative force, whoever siphons off a greater amount of funds from the central decisionmakers is right and ensures himself of development. But my position and my belief is that many people share the view that the matter of allocating funds for the development of one subsector or another cannot be a question of bargaining. The plan cannot arise as a result of bargaining. This is a relict from the past. There must be optimized planning that is subordinated to developmental goals.

[Question] Professor, the Sejm has come out in favor of the second variant of the proposed plan. In your opinion, are the central planners facing an easier or a more difficult situation in the current status quo? Will this make their task easier?

[Answer] The entire discussion moved in the direction of selecting the philosophy of intensive development; this is its most valuable gain. It was pointed out that the traditional approach to planning must be checked out and perhaps rejected. I think that this is a tremendously valuable achievement of the consultation.

We already have had situations where a multiyear plan was approved during the first or even second year of the five-year plan. I would prefer this to the hasty development of a plan today that would make an unfortunate definition of our directions of development. Perhaps it would be wiser to recognize that this five-year plan will be made up of two plans, i.e., a 2-to-3-year period of creating premises for the new structures and then the creation of these new structures. And so, perhaps it should be a two-part plan, i.e., three plus two or two plus three.

8536

CSO: 2600/41

POLAND

COAL TRANSPORT PICKS UP

Warsaw RZECZPOSPOLITA in Polish 25 Sep 85 pp 1, 2

[Article by: Wycz]

[Text] (Own Information). As we have already reported, due to the very thorny situation in coal transport caused by an insufficient number of gondola cars, the minister of transportation temporarily has set limits on the loading of other goods on these cars. These restrictions are in effect on Saturdays and Sundays, as well as on Wednesday of this week, 25 September.

The decision, which forced the speedier return of empty cars to Slask, already has yielded the anticipated results. The mobilization of railwaymen and understanding on the part of many PKP [Polish State Railroads] clients regarding the need to usher in such restrictions have enabled an average increase in coal transport of approximately 30,000 tons per day.

The decision restricting the loading of other goods on gondola cars assumes that the loading of coal for every working day (including Saturdays) amounts to 475,000 tons, 300,000 tons on Sundays and 490,000 tons each on Mondays and Tuesdays.

Often these assumptions are exceeded. For example, on Tuesday, 23 September, cars with a combined carrying capacity of 521,000 tons arrived at the mines and 518,000 tons were loaded. Such action is reducing rapidly the heaps of coal at the mines. According to data provided by the Ministry of Mining and the Power Industry, on 23 September these heaps amounted to 2.487 million tons. Meanwhile, they exceeded 2.7 million tons a few days before. The more rapidly this coal is brought down to a level that ensures the normal rhythm of work for the mines and railroad, the nearer the day these restrictions will be lifted.

Clearly, while the priority treatment given to coal hauling is warranted by the needs of private consumers and industry to amass reserves of this fuel before winter, it impacts unfavorably on the transport service given to other railroad clientele that make use of gondola cars. Due to this, the PKP is offering other cars, e.g., platform cars, as well as box cars for some goods.

A running account is being kept of the transport situation and wherever there is any danger of a production slowdown caused by a lack of raw materials or a surplus of finished products, the gondola cars are sent there out of a reserve specially created for this purpose.

In the second half of 1985, the PKP must transport from 2.5 million to 3 million tons of coal more than a year ago during the same period. This is a very difficult task for the railroad, for forcing the return of empty gondolas to Slask requires a tremendous organizational and mental effort from the railwaymen. Of course there is the realization that this will bring losses to the PKP and losses to many railroad clientele. However, these added costs are the result of a lack of sufficient carrying capacity. There is the hope that during the next few months, the transport situation will improve. This is related to the planned significant increase in deliveries of new gondolas from domestic and foreign plants.

8536

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POLAND

COAL TRANSPORT PROBLEMS CONTINUE

Warsaw ZYCIE WARSZAWY in Polish 27 Sep 85 p 6

[Article by: Ch]

[Text] (Own Information). After the first week of the use by the PKP of extraordinary restrictions on the loading of other goods on gondola cars and on their being directed to the mines after loading, coal reserves on the heaps have been reduced to approximately 50,000 tons. It is anticipated that during the second week, the heaps will be reduced by at least another 100,000 tons. The rolling stock situation also is such that the restrictions on cargoes loaded onto gondola cars this week also will apply on Friday. Too many cars sent abroad with Polish export cargoes are not returning on time from abroad.

The restrictions on loading other goods onto gondola cars have caused increased interest in platform cars. Until recently, the railroads had periodical reserves of this type of car, but at present, with the changed situation, there is also a shortage of platform cars. This is so particularly with regard to the Coastal region. Thus, in the ports there is a shortage of platform cars to transport lumber that is sent by transit through Polish ports to other countries. The situation is complicated by the fact that they must be platform cars that correspond to the standards required along international routes.

This week's extension of the restrictions beyond the initially anticipated 2 days, however, is causing very serious problems in the hauling of other cargoes. It will not be possible to maintain such restrictions over a longer period. However, if the heaps at mines will be reduced at the same rate as at present, perhaps within a month, rail transport will return to normal, or at least to its state prior to the imposition of the special restrictions on hauling. However, the system of reciprocal checks made on the use of railroad cars has shown that not only the work of PKP clients has begun to be criticized, but also the operation of the railroad itself that, it seems, is also not always without fault. It is important, however, that abrupt quarrels about whom to blame for the destruction of cars or their sloppy return should not disrupt harmonious cooperation between rail transport and those that use these services.

8536
CSO: 2600/41

POLAND

BRIEFS

POWER STATION ACCIDENT REPAIRS--The results of the blaze at the Konin Power Station have been eliminated. The power station has again started up Turbine Unit No 4. The turbine broke down during the fire on 18 August 1985. At the time the turbine unit was brought back up, the power station began producing power at its full capacity. This all resulted because of the selfless efforts of the station's safety detachment, particularly the safety and surveying assemblymen: Ryszard Sendlak, Roman Botte, Bogdan Tomczak, Grzegorz Andrzejewski, Stanislaw Arasimowicz, Wojciech Stawicki and Henryk Kucharski. On the other hand, Turbine Unit No 3 has been taken out of operation for modernization of its control mechanisms. This was done also as a result of the blaze. The cause of said blaze was probably the wear and tear of a valve which spilled oil. This may be confirmed after a careful laboratory investigation. [Text] [Warsaw RZECZPOSPOLITA in Polish 28 Aug 85 p 5] 12247

NEW TARIFFS CHIEF--J. Owiek becomes Chief of the Main Tariffs Bureau. The Chairman of the Council of Ministers, acting on a proposal from the minister of foreign trade which was submitted in agreement with the ministry of internal affairs, appointed Brigadier General of the Citizens Militia, Jerzy Owiek, to the position of Chief of the Main Tariffs Bureau. Jerzy Owiek was born in 1930 in Masznie, Skierniewice province, into a peasant family. He earned a degree in administration. At 20 years of age, he joined the Citizens Militia. While serving, he graduated in 1952 from the Officers School of the Citizens Militia in Slupsk. He has continued his service uninterruptedly and has progressed from one responsible position to another of even greater responsibility. J. Owiek has spent more than 20 years in positions of leadership. Among other things, he was a director of the Bureau for Combating Economic Crime in the Main Office of the Citizens Militia. Later, he was in charge of the headquarters of the Citizens Militia in Warsaw and then he became the deputy commandant of the Main Citizens Militia. He is also a member of the Polish United Workers Party. [Text] [Warsaw RZECZPOSPOLITA in Polish 21 Aug 85 p 2] 12247

RAIL TRANSIT DECREASES--Rail traffic over the Baltic decreases. Rail traffic over the Baltic continues to decrease. Both Polish train-and-motor vehicle ferries, the Mikolaj Kopernik and Jan Heweliusz, operating on the Swinoujscie-Ystad line, transported during seven months of this

year 16,919 rail cars and 260,000 tons of freight. These figures are considerably far below what was achieved during the same period last year. The difference is quite large: 1,761 fewer rail cars and 44,000 fewer tons of freight. The amount of Baltic transport rail traffic has decreased from 36 to 32 percent. According to statements made by the Pomeranian District Directorate of State Railroads, this year's decline in the rail traffic over the Baltic was caused by difficult winter conditions. This was proved by the obvious growth in the amount of freight transported in the second quarter of 1985. Growth was particularly great in such areas as: steel, metal products, wood and wood products, cement and chemical products exported by the Polish center for foreign trade to the Scandinavian market. [Text] [Warsaw ZYCIE WARSZAWY in Polish 30 Aug 85 p 2] 12247/9190

FIREWOOD OFFERED AS FUEL--There is a shortage of coal at fuel warehouses not only because of transport problems. For example, this year Warsaw and the province will receive 801,000 tons of hard coal and 242,000 tons of coke. This represents respectively 90 percent and 50 percent of the need. Brown coal, of which 28,000 tons has been ordered, is proposed as a substitute, as well as firewood in a volume of 20,000 cubic meters, which has been ordered for the first time from the Warsaw-area forest inspectorates. An exchange sale has been initiated: for 1 ton of hard coal one is able to receive 3 tons of brown coal and about 3 to 4 cubic meters of firewood. [Text] [Warsaw PRZEGLAD KATOLICKI in Polish No 39, 29 Sep 85 p 4] 8536

NEW ENERGETICS ENTERPRISE--The minister of mining and the power industry has set up a multiplant state enterprise known as the MEGAT Partnership of Power Industry Machinery and Equipment Producers. It will begin its work on 1 October 1985. The creation of the partnership is of primary importance to the implementation of the program for the development of the fuel-power base adopted by the government and for the production of the machinery and equipment needed for this purpose. The work of the new enterprise will facilitate the adaptation of the volume and structure of production to the economy's needs and, it is assumed, will enable us to check the disinvestment process and to modernize many plants. [Text] [Warsaw RZECZPOSPOLITA in Polish 30 Sep 85 p 2] 8536

TRADE TALKS WITH ICELAND -- On 26 September, problems of bilateral economic relations and trade between Poland and Iceland, especially the export of Polish fishing ships to this country, were the subject of talks between the head of the Ministry of Foreign Trade, Deputy Minister Ryszard Strzelecki, and the Ambassador of the Icelandic Republic Niels P. Sigurdsson. [Text] [Warsaw ZYCIE WARSZAWY in Polish 27 Sep 85 p 2] 8536

CONSTRUCTION TALKS WITH AUSTRIA -- On 25 September, Minister of the Construction and Building Materials Industry Stanislaw Kukuryka met with Johan Helchtlinger, deputy general director of the firm STEYR-DAIMLER-PUCH, to speak on further cooperation between the construction ministry and the Austrian firm. [Text] [Warsaw TRYBUNA LUDU in Polish 26 Sep 85 p 2] 8536

AUSTRIAN PORT TRANSIT TALKS-- The 13th meeting of the Polish-Austrian Committee for Cooperation with Seaports ended in Szczecin. Assessments were made of the operation of Austrian transit through Polish seaports from 1980 to 1984 and the potential for its development was considered. [Text] [Warsaw ZYCIE WARSZAWY in Polish 30 Sep 85 p 2] 8536

AGRICULTURAL TALKS WITH AUSTRIA -- Deputy Minister of Agriculture and the Food Economy Kazimierz Grzesiak was in Vienna to meet with Secretary of State in the Austrian Ministry of Agriculture and Forestry Gerulf Murer. During the meeting, assessments were made of achievements made thus far in the work of the joint working group for cooperation in the field of agriculture and the potential for its development was discussed. [Text] [Warsaw ZYCIE WARSZAWY in Polish 1 Oct 85 p 4] 8536

CSO: 2600 /41

ROMANIA

COMMENTS ON UNSUCCESSFUL AGRICULTURAL POLICIES

Bucharest REVISTA ECONOMICA in Romanian No 32, 9 Aug 85; No 33, 16 Aug 85

[Article by Oprea Parpala: "Modernization Guidelines for the Romanian Agriculture in the Conditions of the New Agrarian Revolution"]

[9 Aug 85, pp 14-15]

[Text] As a revolutionary concept between the formulation and theoretical and practical crystallization of which an entire historical era has come to pass --i.e., the period between the ninth and the 13th RCP Congresses--during which Romania has traveled a new stage of development, the new agrarian revolution is essentially an agricultural revolution characteristic of the end of the 20th century in Romania. As a fundamental objective in one of the basic branches of the Romanian economy, it requires--in accordance with the concept mapped out by the Comrade Nicolae Ceausescu and featured in his report to the 13th party congress--"generally changing the way of life, work, and thinking of our cooperative peasantry and achieving agricultural productions that can fully meet the consumer requirements of all the people and other needs for the development of the national economy."

However, general changes and revolutionarizing the working and living conditions of the peasantry--with decisive implications for the ascending evolution of the entire Romanian economy--a priori require a genuine revolutionizing of the manner, means, and methods of modernization of the Romanian agriculture in keeping with the new domestic and foreign conditions amid which the new agrarian revolution is taking place in Romania.* This can

*) In point of fact, the history of world agriculture (like the history of Romanian agriculture) can be viewed as the history of successive agricultural revolutions imposed by the steadily increasing need for agricultural products and permitted by the level of human knowledge attained and its applications in agriculture from the most varied aspects: technological, economic, biological, social, etc. As the most recent we can cite the agricultural revolution produced in the developed capitalist countries (particularly in West Europe) after World War II, a revolution that has brought about a genuine agricultural "explosion."

be viewed as a component element of the contemporary scientific-technical revolution that has affected all the branches of world economy; at the same time, it fundamentally differs from the agricultural revolution in the developed capitalist countries in that it takes place under conditions of socialist production relations in the village, the nature of which determines its socioeconomic purpose and consequences. Its specific traits and conditions --compared to those in which agriculture was modernized in currently developed countries--make it impossible and dangerous to automatically and undiscernibly adopt any of the methods of modernization employed in the world. The efficiency of the efforts made by the Romanian people to modernize the agriculture will depend on the quality of the defining parameters of our own model, derived from our own thinking and from the careful study of Romanian realities, in correlation with the general development of world agriculture.

The present article attempts to study in depth some of these parameters, as they appear in the program documents of the RCP, which reflect the innovative thinking of the party secretary general, Comrade Nicolae Ceausescu.

Reorienting and Restructuring Energy Resources and Consumption

To begin with, we must remember that the Romanian agriculture began its modernization at a time when the energy problem became a restrictive factor for economic growth at world level. All the currently developed countries modernized their agriculture with the aid of non-renewable energy resources that at the time were inexpensive and easy to procure. Thus, complex and complete mechanization, and in particular, complex chemical applications carried even to an extreme, which greatly influences quantitative increases in agricultural production (leading to the emergence of the so-called "productivism" in western agriculture) based, in turn, on the utilization of technologies requiring vast amounts of energy, have become standard practices for what is known as "industrial-type agriculture," in which agricultural labor productivity exceeds the rate of growth and even the absolute level of industrial labor productivity.

On the other hand, the modernization of Romania's agriculture is taking place at a time of deepening energy crisis in the world, when all the states--to a greater or lesser degree, depending on their resources and economic potential --have begun rationalizing energy consumption, primarily the consumption of fossile fuel. The issue of energy supply is of a vital importance for a modern agriculture, especially during certain seasons and "critical" work periods, because failure to complete agricultural work at the optimal time not only leads to increased specific energy consumption, but may even jeopardize the crops.

Thus, the problem of reorienting and restructuring energy resources and consumption with a view to optimally meeting the needs of the process of production modernization, has become particularly topical. Simultaneously with curbing the waste of energy by resolutely implementing a strict system of savings, older and new unconventional sources of energy must be tapped by judiciously combining them with conventional sources (fossile fuel). There is no doubt that the main source of energy for a modern agriculture is and

remains mechanical motive power. No one can plan on restricting the degree of mechanization of agriculture. However, energy consumption used to mechanize all agricultural operations can be made more efficient by supplying the agricultural sector with multifunctional machinery and modernizing and standardizing the entire production of tractors (based on the 65 HP tractor) so that, as the 13th RCP Directives envisage, by 1990 the agriculture should be equipped with 180,000 tractors and a fleet of highly productive machines capable of performing several simultaneous operations, thus increasing productivity and reducing fuel consumption.

In order to correctly assess the problem, we must keep in mind that the agriculture is not only a consumer, but also a producer of new energy (including motive power). We are referring to drawing animals, primarily horses. A pair of horses can draw a car with a load of 5 tons!

There are sufficient factors that argue in favor of this important and efficient motive power in agriculture (particularly for short and medium distance transportation). Field workers are strongly urged to use animals as much as possible to transport natural fertilizer, harvested crops, hay, etc., but the number of horses available is clearly insufficient. Updating records on mares, securing sires of improved breeds for drawing, earmarking fields for fodder (especially oats) under the plan, establishing incentive norms for horse growers (by awarding premiums for each foal raised to the age of 2) -- these are a few of the measures required to work out a program on raising such animals.

In order to redirect and restructure energy resources for agriculture we must also expand the utilization of new (as well as some dating back to the beginning of history), unconventional, and renewable sources of energy such as solar, geothermal, wind, biogas, and biomass. The great majority of these resources are utilized only in stationary agricultural operations: livestock care, irrigation, truck gardening, storage, drying and preservation of agricultural produce, etc.--which are all important for agricultural economy. Biomass--obtained through the utilization of byproducts or agricultural waste, and by cultivating nonproductive land with energy crops--yields fuel that can be used to activate mechanical motive power in the agricultural sector.

Thus, Romania's agriculture has considerable energy resources for the complex mechanization of labor, and by harmoniously combining these resources we can resolutely promote technical progress in all the branches and areas of agricultural activity.

A Judicious Ratio Between Chemical and Natural Fertilizers

However, the greatest amount of energy is required not for mechanization, but for complex chemical applications in agriculture. Thus, while in 1983 energy consumption to power tractors and machines totaled approximately 500,000 tons of fuel, the volume of energy used to produce chemical fertilizer was 3.3 times higher; considering the figures envisaged for 1990 and taking into account the utilization of pesticides, too, the chemicalization-mechanization ratio of energy consumption in agriculture will be approximately 10:1, and the volume of energy thus consumed will rise to 5.4 million tons of fuel.

This last figure gives rise to the question whether, in view of the increased energy requirements caused by the development of all the branches of the national economy, we can afford to exceed a certain limit of strictly necessary level of specific consumption of fertilizer. We believe that the answer "No" is self-evident!

This answer is also reinforced by another circumstance: chemical fertilizer does not have the capability to maintain or restore soil structure, so that, when mechanical equipment is used, the ground becomes compacted, thus requiring either additional energy consumption to carry out agricultural work or crops losses, or both. According to a study done in our country, on all the fields found at various levels of compaction, the overall annual energy consumption increases by 5.2 percent, while production drops by the same percentage figure.

In these conditions, it becomes considerably more important to more extensively utilize manure, a renewable agricultural product that decisively influences soil fertility and agricultural crops. Even if we take into calculation the energy consumption required by its application, it is still 3.5 percent lower than that required to produce the equivalent chemical fertilizer. The compatibility between the utilization of manure and the practice of a modern agriculture is attested by the fact that in countries with a developed agriculture the production of fertilizer elements (NPK) [nitrogen, phosphorus, and potassium] derived from manure is larger than that derived from chemical fertilizer.

The natural fertilizer resources available to Romanian agriculture are verified by the following calculation: the number of animals envisaged for the year 1985 can produce 87-90 million tons of manure (43 million tons from cattle). Considering the norms of nutritive value appreciation practiced in our country, this would mean a production of 1,872,000 tons of active substance (out of which 810,000 tons nitrogen, 306,000 tons phosphorus, and 756,000 tons potassium), i.e., 62 percent more than the consumption of chemical fertilizer of 1983, coming to almost 190 kg. active substance per hectare of arable land.

Unfortunately, however, only a small percentage of this quantity is utilized. In 1983 less than 30 million tons of manure were applied, while the rest was wasted. It was precisely to this situation--unacceptable for an agriculture in full process of modernization--that Comrade Nicolae Ceausescu called attention in his speech to the recent plenum of the National Council of Agriculture, criticizing the failure to utilize about half of the manure production; applying all the manure available would permit the achievement of higher yields per hectare with less chemical fertilizer.

Guidelines for Crops and Livestock Structure

Saving energy in agricultural production casts a new light on the issue of crop structure. A medium and long range crop rotation system based on judicious crop rotation can ensure the preservation and natural restoration of soil fertility and can help combat disease and pests, while requiring minimal consumption of chemicals (fertilizer, pesticides, and herbicides). To

discontinue the cultivation of one crop over a period of several years, and to crystallize a clear concept on crop rotation--in the conditions created by the existence of joint agroindustrial councils and by expanding irrigation--requires a certain crop structure, within which grain crops should make up not more than 50 percent of the crops. Simultaneously with more extensively diversifying zonal crop structure, the percentage of fodder pulses must be increased, because they contribute to increasing soil fertility, as well as providing a better quality of fodder, which is a basic condition for turning livestock breeding into a primary branch of Romanian agriculture.

The same considerations also require perfecting the structure of crops in the sense of increasing the share of those belonging to group C4, that is to say, crops that have a greater capacity for absorbing and transforming kinetic solar energy into potential energy (such as, in our country, corn, sugarbeet, soybean, and others).

At the same time, the livestock structure should be geared on primarily developing breeds consuming fodder plants that require lower specific energy consumption. This explains the resolute trend toward more rapidly increasing the number of cattle and sheep (primarily in order to utilize the more than 4 million hectares of natural pasture land, and grain byproducts).

[16 Aug pp 12-13]

[Text] In the first part of this article we talked about a first characteristic specific of the process of modernization of Romanian agriculture in the conditions of the new agrarian revolution: the reorientation and restructuring of energy resources and consumption, with its implications for the utilization of renewable energy resources, the reevaluation of animal motive power for local agricultural transports, the ratio between chemical and natural fertilizers, and the structure of crops and livestock.

The second condition that generates this characteristic concerns the phenomenon of pollution under a dual aspect: agricultural and environmental pollution.

The excessive chemicalization of agriculture, particularly through the use of pesticides, leads to the pollution of agricultural produce. In developed countries which failed to take the necessary measures on time, the pollution of agricultural produce has acquired worrying proportions, and has led to the emergence of a genuine "biologist" current which demands a return to the old methods of cultivation and to a "biological" agriculture. At the same time, because of the excessive use of chemicals and industrial-type animal husbandry (which features, among other things, the crowding of large numbers of animals, thus making the removal of waste a practically unsurmountable problem), agriculture--accepted in the history of civilization as a factor against pollution--has itself become a source of environmental pollution. We are all familiar (in our country, too) with the harmful effects of the uncontrolled evacuation of large quantities of waste from industrial facilities for raising pigs, and even poultry.

Romania is one of the countries that has by law limited the specific consumption of pesticides (and let us not forget that pesticides are also energy-intensive), and has totally banned the utilization of some pesticides that constitute a health hazard. According to the 13th party congress directives, the production of pesticides will be geared on nonpolluting varieties with long-term effects, and the chemical treatment of diseases, pesticides, and weeds will be harmoniously blended with the utilization of biological methods.

The Implementation of the Achievements of the Biological Revolution

The feasibility, and even need of such an orientation in agricultural modernization is permitted by the fact that currently, world agricultural can tap important achievements of the biological revolution in the form of genetic engineering, which allows for human intervention in the most difficult and complex aspects of plant and animal life; with its aid, miraculous changes can be effected in the productive potential of current species and strains of plants and breeds of animals, or new ones can be created (perhaps even new species) with a higher biological potential, capable of better utilizing the present production conditions, without necessitating additional energy consumption (even in the form of fertilizer or pesticides). On this basis, the biological revolution applied in agriculture provides a definitive and supporting answer to the theory of "productivism" in agriculture. Far from reducing productivity per hectare or animal, the reduced consumption of fossile energy resources required (particularly polluting resources) contributes to increasing it, and especially to improving the quality of agricultural produce, by increasing the quantities of nutritive elements and eliminating health hazards.

One of the vital achievements of genetic engineering, which can produce a real technical explosion in Romanian agriculture--where grain crops make up almost 2/3 of the arable land--is biologically fixing air nitrogen, which is currently the attribute of pulses (annual and perennial) alone. It is believed that nitrogen-fixing symbiotic organisms associated with pulse crops can fix up to 350 kg of nitrogen per hectare and year for field crops. Increasing the role of biological nitrogen fixing in increasing the energy resources of agriculture for the purpose of agricultural modernization is predicated by: a) intensifying the nitrogen-fixing process of cultivated pulses (for example, soybeans grown in an atmosphere enriched with carbon dioxide can gather from the air 425 kg. of nitrogen per hectare, as compared to only 75 kg. per hectare in normal conditions); b) expanding the utilization of nitrogen-fixing organisms for crops other than pulses; c) transferring from one bacteria to another genes that control the nitrogen-fixing.

Along these lines, the 13th congress directives required Romanian science to enhance its contribution to developing the agriculture upon modern bases, by channeling research in applied biology and genetic engineering toward the creation of new, more productive and resistant strains of plants and new, more adaptable breeds of animals, with a view to ensuring larger yields and raising the productivity of agricultural work.

Neutralizing the Negative Effects of Climatic Conditions

The adoption of agrotechnical, economic, organizational, and ameliorative measures to neutralize the negative effects of natural factors, particularly weather, has been one of the major objectives of the agrarian policy promoted in Romania. Along this line we can cite the national land amelioration program, designed to permit large, safe, and stable crops, worked out at the initiative of the party secretary general, Comrade Nicolae Ceausescu. As is known, the influence of natural conditions cannot, by and large, be eliminated. However, man can understand and put these natural factors to agricultural use. This is, in point of fact, the objective of the above mentioned program, an objective that can be attained in several ways.

Firstly, the study and understanding of soil and climatic conditions permit the establishment of modern technologies adapted to each crop, that can circumvent the "critical" periods in the development of each crop, thus permitting large and stable harvests. At the recent plenum of the National Council of Agriculture, Comrade Nicolae Ceausescu particularly stressed the need to modernize the production technologies of each crop separately, because in this manner we can obtain increased agricultural productions in conditions of maximum efficiency and with minimum energy consumption.

Secondly, as is emphasized in the 13th congress directives, we must adopt new solutions for establishing optimal zonal crop distribution, in view of the fact that judiciously allotting each branch and crop in keeping with its soil and climatic requirements can increase yields by 15-20 percent without any additional material investment, except for the investment of intelligence.

However, the major means of neutralizing the negative effects of climatic factors by modernizing the material resources of agriculture, is establishing a national system of land amelioration, within which the greatest attention would be given to irrigation, in harmonious coordination with soil draining and drying, so as to be able to adapt to changes in precipitation patterns, and also meet various needs throughout the country. In view of its provisions on considerably expanding the area of irrigated, drained, and reclaimed fields, the national land amelioration program asserts itself as a powerful lever for modernizing the Romanian agriculture.

However, the implementation of the new agrarian revolution, viewed primarily as a revolution in economic thinking--as the party secretary general pointed out--requires in this area, too, new solutions concerning agricultural modernization.

As is known, since ancient times, irrigation has been one of the major means used by man to increase agricultural production in keeping with the requirements of his social development. There is, however, a paradox in the modern world: the largest irrigated lands are found in areas affording the least quantities of food per capita and cultivated predominantly to one crop (such as rice in the Far East). This shows that as in the past, irrigation can contribute to improving natural and material conditions of agricultural production, but cannot completely eliminate the negative influence of climatic factors. Moreover, large specific investments are required to irrigate land,

and the exploitation of irrigated fields--in conditions such as the ones prevailing in Romania, where the level of the major water source, the Danube, is far below the level of the irrigable areas--requires large energy consumption. Naturally, expanding local irrigation systems (with lower investments) and more extensively practicing furrow irrigation (which requires less energy) does permit the more efficient utilization of the irrigation system, but is not sufficient to make up for the above mentioned restricting factors.

The definitive and long-term solution seems to us to be the achievement of a climatic revolution, whereby man would progress from understanding to controlling the weather, particularly precipitation. It is possible that this revolution may be more difficult and require a longer period of time than was needed for the biological revolution to become--through genetic engineering--the most important means of modernizing contemporary agriculture; but the great expenses that mankind invests in space research are bound to lead to a more profound understanding of Terra's meteorological conditions, so that the "probable weather conditions" can become "possible" or even "certain." Naturally, this is a problem that will not be solved by one country alone, because it requires vast financial and technological resources, affordable only within a broad international cooperation. Such a program (unlike the "Star Wars" type programs which appropriate huge resources that could finance the future development of civilization on earth) would effectively contribute not only to peace, but also to well-being and food security for all mankind.

This, however, does not mean that Romanian science cannot contribute to better understanding and utilizing climatic factors, by expanding domestic meteorological research so as to permit longer-term weather forecasts, more closely linking meteorology to agriculture, and turning it into an active modernizing factor for agriculture. As envisaged by the relevant directive of the 13th party congress, Romanian science must increase its contribution to achieving large, safe, and stable crops regardless of weather conditions.

But regardless of the development and technical equipment provided for agriculture, the main force of production in this branch remains the labor force, without whose "modernization" there can be no agricultural modernization. The excessive manpower migration from villages to the city has had negative consequences that must be eliminated if we are to practice a modern and scientific agriculture. The intensive development of production--the main objective of the new agrarian revolution--within the context of the policy of saving fossile energy and increasing the contribution of agriculture to increasing the national revenues, requires a revision of the quantitative aspect of manpower in agriculture. The 13th congress directives stipulate that by 1990, 27 percent of the overall employed population (which is 11.5 million) will be employed in agriculture, which will mean a total manpower of 3.1 million people (more than in 1983). This increase in absolute figures requires --aside from the measures already taken to raise the urban level of civilization of the communes and to develop non-agricultural activities in rural environments)--an expanded system of material incentives designed to keep in the agricultural sector as many village young people as possible.

Such a solution to the quantitative aspect of the problem will also bring about qualitative improvements, in that the age structure of the people employed in this sector would improve. At the same time, training 590,000 skilled persons for the agricultural sector, by expanding the curriculum of agroindustrial schools (placing the emphasis on students learning several skills) and closely linking the schools to production and research, will contribute to raising the level of qualification of agricultural personnel to that required by the modernization of all the production forces that must be involved in implementing the new agrarian revolution.

Increasing the Functions and Responsibilities of Local Agricultural Management

Building a modern agriculture of a new type, in accordance with our specific national traits, traditions, and potential--an objective frequently stressed by Comrade Nicolae Ceausescu--also requires a revolution in the concept of agricultural management. The functional economic mechanism of agriculture must to a greater extent take into consideration the great regional diversity of production conditions and the interests of the various socioeconomic compartments of agriculture, and provide them with incentives to promote technical and economic progress, with a view to building a modern, highly productive, and profitable agriculture. In particular, centralized leadership must be harmoniously combined with local or production unit autonomy, with a view to more economically tapping the many local production resources available. This requires strengthening the role of planned leadership simultaneously with increasing the functions, competence, and responsibility of local agricultural management bodies and of all agricultural workers, in their triple role as owners, producers, and consumers. In his report to the 13th congress, summing up the essence of the new economic-financial system, Comrade Nicolae Ceausescu stated that this system must unite socialist ownership and the system of socialist production, with extensive mass initiative and material incentives. Basing all socioeconomic activities in agriculture on the principles of regional self-supply, self-management, and self-administration would result--in Comrade Nicolae Ceausescu's concept--in a continuous increase in economic efficiency and profitability, as the proof of a modern and intensive agriculture.

12782

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ROMANIA

EFFORTS TO IMPROVE NAVAL TRANSPORTATION

Bucharest REVISTA ECONOMICA in Romanian No 37, 13 Sep 85 pp 8-9

[Article by Constantin Alexandrescu, director in the Department of Naval Transportation, Ministry of Transportation and Telecommunications]

[Text] Fulfillment of the general goals for the economic-social development of Romania and of the provisions in the party program for creating the multilaterally developed socialist society require as a basic condition the exemplary and complete fulfillment of plan tasks in each branch and sector of activity of the national economy. The interdependencies being demonstrated within a modern, planned economy such as ours mean that the results obtained in one economic unit should depend on and directly influence the way the activity is carried out in a large number of other enterprises with which it has connections of collaboration at various levels. In this context, transportation, a basic branch of our national economy, which provides for moving goods between producers and consumers, has special tasks and, within this, naval transportation, called on through efficient utilization of the naval fleet at high indicators to contribute, on one hand, to steady and timely supply with raw materials and materials of the economic units and, on the other, to finalization of the exports of the economy's processing branches under good conditions.

In the years of building socialism and particularly in the last 20 years since Comrade Nicolae Ceausescu has headed the party, Romania's naval fleet has seen broad changes, both quantitative and qualitative ones, in full agreement with the permanent increase in this sector's tasks, brought on by the continual amplification of the national economy's production potential. So if we refer to river transportation it should be stressed that at the end of 1984 the tugboat-pusher fleet was 118 percent larger than in 1970, while their traction power had almost tripled; the fleet of barges and motorized barges also showed large increases, as their number rose nearly 1.5 times and their capacity--218 percent. With regard to sea transportation, Romania currently has available 240 ships with a total capacity of more than 4.2 million tons dead weight in a diversified structure: tankers, ore carriers, various types and capacities of cargo ships as well as specialized ships.

In the first eight months of this year, the activity carried out in the naval transportation sector specifically consisted of obtaining volumes of goods transported which were higher than those in the same period last year, with the sea

ships, for example, providing the transportation of more than 15.6 million tons of diverse goods, from raw materials up to complex products of our processing industry. Despite this, as was also stressed at the 4 September 1985 meeting of the RCP CC Political Executive Committee, the results obtained in this important area of activity are not at the level of technical and technological opportunities which exist or of the requirements and demands imposed by providing the conditions needed to fulfill the goals set by the plan. The total volume of transportation provided to be achieved with sea ships was only 87 percent, a situation caused primarily by not fitting in the planned level of indicators for use of the ships. Utilization of the sea ships under the planned indicators has at its base both subjective factors (failure to respect the programs and timetables for transportation, exceeding the time it took to make the trips, failure to respect the port operation standards, which led to longer standing time for the ships at loading-unloading and so forth) as well as objective factors (some delays in supplying fuel and providing for efficient flow of economic-financial activity), factors which as a whole are reserves for improving activity, the full utilization of which, through some technical, technological and proper organizational measures, would be able to provide the necessary conditions for recouping the lags and having total fulfillment of the plan provisions for this year.

In conformity with the tasks drawn at the recent meeting of the RCP CC Political Executive Committee and with the guidelines set at that time by the party's secretary general, Comrade Nicolae Ceausescu, who asked that the lacks and defects existing in the transportation activity be eliminated as soon as possible, the actions initiated and which will continue to be initiated, directly and with the aid of the central organs and ministries with foreign trade tasks to raise naval transportation activity to new levels of efficiency seek to do the following: improve the organization and leadership of the maritime fleet as a basic condition for providing an optimum framework for carrying out activity; improve the operating standards for ships in the Romanian ports as a decisive condition for increasing efficiency; reduce the standing time of ships for the loading-unloading operations as a source for increasing efficiency; provide maximum use of the fleet capacity as a concern oriented toward increasing the volume of goods transported. These are goals intended to create conditions which would provide transportation of around 80 percent of the volume of foreign trade goods traveling in maritime traffic with Romanian ships by 1990, in accordance with the provisions of the directives of the 13th party congress.

The concerns aimed at reducing the standing time of ships for the loading-unloading operations are one of the main concerns for improving the fleet's activity and increasing maritime and river traffic under conditions of greater efficiency, and it is a factor with direct effects on increasing the time of traveling with cargo, reducing the length of the total transportation cycle and increasing the coefficient of utilizing the ships in operation. For this purpose the current operating standards have been reanalyzed for ships in the ports of Constanta, Galati, Braila, Tulcea, Mangalia, taking into account the level of technical supply, the standards practiced at the world level, the specialized techniques for handling the goods which have been introduced and developed, the need for increasing the amount of modern technique in operating mass goods and so forth. On the basis of the analyses made improved standards have been worked out--ones which provide for increases as follows compared with the old standards: 9.5 percent for Constanta, 9.9 percent for Galati, 6.5 percent for Braila, 12.5 percent for Tulcea and 5 percent for Mangalia; application of them permits an increase of around 13.2 million tons per day in traffic capacity of the ports, which leads

directly to reducing the average standing time of ships in the loading-unloading operations.

Special attention continues to be given to extending and generalizing modern transportation techniques (tied in packages, containers, palletization) both for the beneficiaries of the transport as well as in the sea and river ports, having in mind their beneficial effects. Containerization of goods in the case of export-import traffic by sea has important effects on the degree of mechanization of the loading operations in the ports, reducing the ships' standing time and reducing handling expenses. The introduction of containerization in sea traffic leads to a spectacular growth in the productivity of port workers; compared with the classic transport techniques, the production obtained by a formation on a shift is 20-40 times greater in the case of containerization.

In order to sustain these kinds of actions, the programs drawn up provide for supplying the fleet (spread out up to 1990) with around 3,500 containers of 20 and 40 feet for the maritime fleet, among which special containers are for the transporting of chemical fertilizers, 10 are automated stackers to transport the containers, various specialized equipment for serving the RG-RO-type ship (20-ton and 40-ton rollpalletes, motor tugboats) and so forth.

A third direction of action for reducing the ships' standing time for loading-unloading is continued growth in the degree of mechanization for operations of handling the goods in ports so that there is an even greater reduction in the dockers' physical effort and this would provide for sustained growth in labor productivity. In order to achieve this, we are seeking continuation of the action to introduce devices for the mechanization of operations for hoisting, removing and piling packages and sacks, supplying all bucket cranes with scales to weight the goods right as they are being loaded into the cars, supplying the ports--spread out as they are assimilated in the country--with new equipment for handling goods (low-gauge 1.5-ton mechanical pilers, mechanical loaders of 1.5 cubic meters with low gauge and independent front-back traction, 3-ton portal cranes, 16-30-ton mobile cranes, various mobile and floating installations for handling of powdery goods and so forth).

The particularly mobilizing tasks placed before naval transportation by the party and state leadership and the need for providing conditions to obtain a high volume of transportation from one stage to another have required that in the action as a whole to raise the activity being done in this economic sector to new levels, a special role should be given to developing the capacity of the ports and the naval fleet in accordance with the demands required by satisfying the national economy's transportation requirements to a greater and greater extent. Currently, in accordance with the indications of the high party leadership, a broad program is being worked out for modernization of the Romanian sea and river ports and of the techniques for handling and diversifying supplies so that starting even this year the performances of the Romanian ports should rise to the level of the most well-supplied ports, together with intensifying efforts to have advance completion of the jobs to extend the port of Constanta. Referring to the growth in port capacity, it is worth pointing out that the program of measures for continued improvement of actions for preparation, programing and flow of goods for import, export, transit and coast navigation by sea and on the Black Sea-Danube Canal, a program drawn up under the direct guidance of Comrade Nicolae Ceausescu, includes actions and measures which actually are directed at

all the Romanian ports of the Danube and the Black Sea. Through various set-ups, supplies, equipment, completions, systematization, construction and reconstruction projects, they are seeking a growth in the volume of goods transported to be obtained, for the opportunity to be created to use modern transportation techniques, for higher productivity to be recorded in the loading-unloading operations.

The increase in capacity of the sea and river fleet is closely connected with the need to increase the volume of goods transported. In achieving this goal, along with supplying new ships under the timetable forecast, ships with high technical-operational characteristics, an important contribution also will be made by the actions and measures taken in our units in the direction of improving the ships' operations by increasing the indicator of utilization so that a relative growth in transport capacity is obtained with additional investments.

Measures to improve activity in naval transportation also aim at improving collaboration among all factors involved in the transportation process: beneficiary enterprises and organizations, enterprises for port operation, regional railroad enterprises and sea and river navigation enterprises. The efficiency of the transport, the volume of goods transported during a certain period of time and the efficiency obtained depend directly on the way in which this collaboration is carried out. In this context we are seeking in particular the elimination of all situations which mean that the ships cannot be loaded and unloaded in conformity with the existing norms so that maximum utilization of the fleet is ensured and payment of layover days to the foreign ships is avoided, ensuring of respect for the monthly programs by all the factors mentioned, respect for the duty that the goods are sent to ports only on the basis of acceptance given by the port commanders, correlated with the date of the ships' arrival in ports and with the capacities of storage areas so that overcrowding is eliminated and an optimum flow of goods in the ports is provided, respect for the provisions for presenting the goods for transport (it would be useful for the sale-purchase contracts concluded by the foreign trade enterprises to also provide appropriate clauses on this matter) in order to permit use of modern techniques for transportation and high level of mechanization of the loading-unloading jobs.

The overall actions taking place or being applied to improve activity and increase efficiency in naval transportation, along with the measures presented, also include others aimed to increasing running time with cargo, improving navigation conditions, increasing the average services per unit of capacity, improving activity for repair and maintenance of the naval fleet, assimilating a higher volume of spare parts, the reconditioning and reuse of aggregates to a greater extent, optimizing the relations of sea and river transportation, recruiting, training and raising the vocational level of all worker personnel so that, as required by the party's secretary general, Comrade Nicolae Ceausescu, it fully corresponds to the high demands and responsibilities belonging to this particularly important sector of the national economy.

8071

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ROMANIA

CONSULTING ENGINEERING DEVELOPMENT, ACTIVITY DESCRIBED

Bucharest REVISTA TRANSPORTURILOR SI TELECOMUNICATIILOR in Romanian No 4,
1985 pp 37-42

[Article by Emil Spirea et al.: "Export of Research and Consulting, a Form of Modern Trade in Knowhow"]

[Text] This article discusses foreign marketing of Romanian scientific research through export of consulting engineering, with particular emphasis on the specific features of this engineering in the field of transportation. The question of services capable of being exported is examined at the end of the discussion.

The level of supply reached by the Romanian economy and the degree of industrialization and technological development in particular, along with the foreseeable trends in the evolution of world trade, create favorable conditions for occupation of an prominent place by consulting engineering in addition to the traditional forms of commerce, both as regards the percentage of Romanian exports and as a factor in involvement and promotion of integrated exports, winning new markets, and ensuring complete stability in markets in which Romanian enterprises have established their position as exporters of competitive products.

This also represents the basis of the achievements of Romanian science and technology, which have brought about a significant qualitative change on the plane of foreign economic relations, given concrete expression in the transition from large-scale imports of knowhow to reduction in such imports and increased foreign marketing of Romanian knowhow.

The documents adopted at the 13th Congress of the Romanian Communist Party provide that by 1990.95 percent of Romanian products are to measure up to world standards in point of quality, and at least 2 to 5 percent of these products are to possess performance and quality characteristics which put Romania in first place in the world.

1. The Consulting Engineering Concept

Research and consulting activities cover a vast area given material expression, as a result of a series of technical and economic research

projects and reasoning, in solutions which are the best for making decisions regarding the subject of consultation.

A number of definitions are given in the specialized literature; some of them are presented by way of illustration in what follows.

Consulting activity is study and research, ordered by a customer, of technical and economic potential in a particular field assigned as a topic by the customer and the giving of appropriate advice to the contractual partner. The consulting activity is strictly in accordance with the customer's interests.

Engineering activity is study and coordination of various subjects or specialties by engineers and technicians, who generally work as members of a team, to carry out or commission a project or a set of projects.

The role of the consultant as a professional is to assist enterprises in solving organizational, operational, and technical problems.

There is currently no general agreement in the matter of strict delimitation and definition of consulting activity as distinct from engineering, especially since the concept of consulting is used along with that of engineering.

From the commercial viewpoint, the two activities serve a common purpose, marketing of knowhow (technical, economic, organizational, etc) by specialized offices or enterprises.

The two concepts are defined as follows as regards the way in which the results of activity are applied:

Consulting activities are of the nature of rendering expert technical or economic opinion which concludes with recommendations which may or may not be applied by the customer.

Engineering activities represent technical, economic, organizational, or other decisions which are binding upon the customer.

The activities are often distinguished on the basis of this difference.

2. Areas and Nature of Research and Consulting Activities Worldwide

In recent years research and consulting activities have undergone increasing development and diversification reflecting the general trend of industrialization and technical progress observed throughout the world.

Two trends may be singled out in this context, broadening of the range of services offered by consulting engineering firms, as a result of inclusion of an increasing number of spheres of activity and initiation of new services in these fields, and orientation of consulting services toward integrated consulting through transition from simple consultation to turnkey delivery of plants and completion of plants to the extent of production startup.

Studies and projects constitute a basic component of this activity; they include suitability, feasibility, and technical and economic studies, drawing up specifications, market studies on promotion and marketing of products, industrial development projects and plans, project evaluations, materials for prequalification and participation in bidding processes, and evaluation of bids.

These operations are performed on the basis of contracts signed with foreign partners and stipulating in detail both the technical requirements in accordance with which operations are to be carried out and the delivery stages and deadlines. The drawing up of the contracts requires allowance for a number of particular features determined by the following:

the technical regulations in force and the local legislation on the basis of which construction activities are accomplished, from the viewpoint of planning and design, awarding of contracts, and financing, and from that of execution of the work;

the obligation of collaborating as a subcontractor of the planning and design base with local firms of the contract partner, which in most cases do not meet either the work completion deadlines or the project requirements;

the foreign partner's obligation of obtaining evaluations, approvals, and other bank formalities required by the laws in force;

the need for local inspection by missions sent to assemble technical and economic data on the existing situation, at the beginning and during certain stages of the planning and design process;

the absence of certain technical and technological details which are required by foreign partners and which cannot be obtained ahead of time by the pertinent specialists, etc.

At the same time, the nature of consulting services is determined by the specificity of the services, which requires that specialized firms or individual consultants comply with the customer's wishes and act only in his interests, in accordance with the obligations which they have assumed.

The capabilities of the specialized firms or the level of technical knowledge (theoretical and practical) of consultant specialists must be recognized by government authorities on the basis of special testing leading to certification or issue of a license for engaging in consulting activities.

There are markets for consulting services both in developed capitalist countries, socialist countries, and developing countries. Each market has particular features of its own.

3. Romanian Exports of Consulting-Engineering

In its general effort to industrialize and rapidly reach the level of a country of average economic development, Romania is displaying increasing interest in participating in development of trade in knowhow in both directions, resorting to importation of technologies but also asserting itself in the process of world trade through exports of technologies. At the same time, it is creating the legal framework for engagement in this activity, by establishing the Romconsult consulting organization and orienting foreign trade enterprises in the direction of performance of consulting services in their own spheres of activity, ones such as Industrialexportimport, Uzinexportimport, Vitrocim-Forexim, Romenergo, Contransimex, etc.

Analysis of Romanian technology exports over the 1975-1983 period from the viewpoint of structure reveals that such exports have generally been made in areas in which Romania has gained technical experience comparable to that of the developed countries, that is, extractive industry (29 percent), the chemical industry (27 percent), the machinebuilding industry (11 percent), and transportation and telecommunications (10 percent).

The principal forms of marketing of Romanian technical and scientific potential have been technical assistance (48 percent) and research and documentation services (38 percent).

An important part in this activity is played by Contransimex, a foreign trade enterprise of the Ministry of Transportation and Telecommunications specializing in marketing and execution of construction and assembly projects and operations in the field of transportation and telecommunications.

Its sphere of activity comprises a broad area of endeavor, from elaboration of projects to complete execution of such projects, specifically, railroads, highways and superhighways, civil engineering structures, harbor and hydraulic engineering structures, airport structures, assembly operations, specific installations and equipment, telecommunications, etc.

Making its debut on the foreign market in 1972 first by providing technical assistance in execution of operations abroad as a subcontractor and continuing with various forms of participation, the Contransimex foreign trade enterprise has today reached a level and capacity enabling it to compete on the world market in construction and assembly.

From the statistical viewpoint, exports of studies, projects, and technical assistance represent around 5 percent of the total volume of activities, made up chiefly of technical studies (preliminary engineering projects), general research and planning, final projects and project completion documentation, including plans and specifications, technical assistance during the execution, testing, and final acceptance period, and personnel training.

4. Efficiency of Consulting Engineering Activities

The specific nature of consulting engineering activities is reflected both in the high level of economic efficiency resulting from activities of this type and in the method of determining and quantifying economic efficiency.

Analysis of the ratio of income to expenditures and of the return rate value for each operation shows that exports of this type are a significant source of national income.

It should be stressed that the particular features of consulting activities have a direct bearing on total expenses. A substantial share of these expenses is represented by subsistence costs (housing, per diem allowances) and costs for transportation of the personnel participating both in collection of research and development data and in local analysis of the various stages of completion, in both review and implementation of final projects.

The level of these costs depends largely on the type of service and the particular features of the sector for which the service is performed. We know that each operation forming part of this activity has specific features of its own, the degree of general applicability generally being limited, and that decisions can be made only on the basis of direct analyses performed at the site.

In each individual case there are certain specific elements in establishment of the foreign cost of activities of this nature, but the specialized literature and worldwide practice recommend the following methods for broad areas of application.

(a) determination of cost as a percentage of the estimated cost in foreign currency, or the effective investment cost, or the cost of equipment and materials for the respective facility;

(b) determination of cost on the basis of the time actually worked and the profit;

(c) determination of cost on the basis of the expenses of the consulting engineering company.

The following indicators are generally calculated for determination of the profitability level: the foreign currency inflow (in dollars), profit (in dollars), the planned profit realization index (in terms of value), and the rate of return (in lei per dollar).

5. Specific Features of Consulting Engineering in Transportation

The characteristics of consulting engineering services in the field of transportation are organically linked to the particular features of transportation activities, which represent a sector of material production experiencing continual change, improvement, and modernization.

The transportation processes presuppose the existence of conditions specific to vehicles and component equipment, which are characterized by high dependability, a long service life (15-40 years), high production and investment costs, and special traffic safety requirements.

At the same time, the evolution of the structure of transportation systems has led indirectly to the appearance of a number of new elements in the area of costs incurred for transportation, investment costs, the potential for use of existing capacities, traffic safety, energy consumption, consolidation, the effect of transportation on the working and living conditions of persons in the transportation system and the public at large, etc.

In addition, the energy crisis which arose back in 1973 has had repercussions in all economic sectors and has led to reconsideration both of the energy efficiency of different modes of transportation and of the structure of transportation systems themselves.

In this context we are witness in the area of transportation to a general process involving modernization, improvement, repair, and development of existing infrastructures so as to enable them to accommodate present and future traffic; development of new ways and means of transportation aimed at creation of a national transportation system, proper management of resources, and rational use of funds; establishment of the compatibility of national transportation systems with available national resources, economic and environmental conditions, and institutional characteristics; elaboration of programs and guidelines for the strategy of transportation system development, determination of the performance characteristics of the new equipment; and establishment of the technical, economic, ecological, psychological, and other effects.

All these elements, amplified to a greater or lesser extent as regards area, resolution, and applicability, are included in the socioeconomic programs and policy of the great majority of countries. The level of technical and economic development and the ability to assimilate contemporary scientific and technical progress are decisive factors in speeding up the development of an integrated transportation system or only of a particular mode of transportation.

At the same time, the objectives of transportation are broad in scope, involving both government agencies of particular countries and other international organizations. Most investment objectives in any other field (industry, agriculture, sociocultural concerns, tourism, etc) are accompanied by transportation objectives which are studied separately, as a separate aspect of the objectives involved.

Hence to solve these problems some countries, and developing countries in particular, are more and more seeking the assistance of transportation companies and organizations with experience in this field, thereby establishing collaboration relationships in a variety of forms (cooperation, trade, exchange of information and documentation, specialization, scholarships, personnel training courses, etc).

The demand for consulting engineering is intensifying in the context of this activity, both in the form of studies and projects requested by a customer and as an accompaniment to exports of goods and products, construction and assembly operations, and so forth.

6. The Current Context of Consulting Engineering in Transportation

From the viewpoint of adaptability to the conditions imposed by market requirements (cost, quality, performance), the level of equipment and material resources, the degree of professionalism and experience of Romanian personnel, and the results achieved thus far, it may be inferred that the services offered by supplying organizations under the Ministry of Transportation and Telecommunications fall within the range of competitiveness encountered on the consulting engineering service market.

This is also indicated by the performance of engineering, construction and assembly, and other services in European, Asian, and African countries.

From the viewpoint of level of supply, the Romanian transportation system today has some of the most modern traction equipment, constantly improving railroad rolling stock and motor vehicles, routes of communication (railroads, highways, navigable canals) measuring up to international standards, installations and equipment marked by high dependability, safety, and performance (individual items of which are exported to the majority of the world's countries), and personnel with high professional qualifications.

From the viewpoint of equipment engineering, the transportation system today has organizations specializing in operation, maintenance, and repair of transportation equipment, routes of communication, and the pertinent installations; planning and design of investment projects, at two research and development institutes specializing in facilities in the sphere of railroad infrastructures (railroads, buildings, repair and maintenance shops, stations, depots, inspection stations, installations, civil engineering structures, structural reinforcements, waterproofing systems, foundations, soil erosion control systems) and in that of highway and maritime infrastructures (roads and highways, garages and hangars, ports, etc); technological research and engineering, performed for all transportation subsectors at a transportation research and development institute; construction and (turnkey) delivery of all facilities required for transportation, within the Railroad Construction General Contracting Central and the Hydraulic Structure General Contracting Central and by enterprises specializing in hydraulic structures, ports, airfields, roads, etc; and marketing of construction engineering services and construction and assembly projects in the field of transportation and telecommunications, by Contransimex, a specialized enterprise of the Ministry of Transportation and Telecommunications.

7. Services Susceptible to Exportation

The "potential" consulting engineering portfolio in the area of transportation includes projects affecting the sphere of routes of communication and pertinent installations, transportation equipment, operating and repair technologies, and optimization of specific processes and activities of railroad, automotive, and ship transportation, as embodied in

prefeasibility and feasibility studies, finished designs, operating technologies, procedures, analyses, technical solutions, etc.

The level of material resources and the capabilities and scientific potential of Romanian research personnel make it possible to deal with problems over a broad area in connection with the following subjects:

Establishment of transportation potential from a territorial viewpoint;

Evaluation of requirements;

Determination of the demographic impact and that of general economic progress on the development of transportation;

Investigation of the possibility of optimizing processes;

Assessment of priorities in the sphere of investments;

Evaluation of specialization in the structure of services and the vehicle fleet;

In general outline the main areas are the following.

General problems of transportation organization;

Combined transportation;

Optimization, rationalization, and improvement in operation and production;

Improvement in technical and economic indicators;

Structural solutions and technologies for roadways and civil engineering structures, including bridges;

Technologies and equipment for roadway treatment;

Equipment and technology for operation, inspection, and repair of railroad rolling stock, motor vehicles, and watercraft;

Roadway systems and civil engineering structures;

Structures and technologies for roadway operation and modernization;

Computer programs and optimization;

Simulation techniques;

Operational methods in the area of decision making and stock management;

Prevention and control of environmental pollution;

Geological and geotechnical, hydraulic engineering, and transportation and traffic research in urban areas;

Data processing systems in the areas of traffic engineering, automatic traffic count processing, multiple-criterion optimization/distribution of freight transportation, and economic and financial analyses and calculations;

Personnel training in the field of railroad and watercraft transportation;

Organization of harbor activities;

Increase in the traffic handling capacity of maritime and river fleets;

Testing and measurement of vehicles, equipment, and subassemblies.

Findings

The socioeconomic development of Romania over the last 3 decades, involving passage through the stages of reconstruction, consolidation, and comprehensive development in a brief period of time, has enabled the majority of technical and economic personnel to acquire valuable experience covering the majority of the sectors of activity in the country.

The level of theoretical and practical training and the ongoing advanced training of every specialist employed in production, research, and educational activities place Romanian specialists at a high level of competence.

The arsenal of Romanian knowhow is used to the maximum through them in the context of the consulting engineering services performed by Romania.

Consulting simultaneously acts to promote exports of Romanian equipment and installations under favorable conditions.

Romanian consulting is enjoying increasing success on the foreign market, and especially on the market represented by the developing countries, because these countries face problems similar to the ones Romania has solved in the past, thereby gaining the experience required in surmounting all the obstacles which might arise in dealing with problems in the areas discussed here.

A decisive role is played in this activity by scientific research, which has now become an essential factor in economic growth, in bringing about qualitative changes in foreign economic relations, and in winning a permanent place for Romania in commerce in intellectual assets, as major supplier of technical and scientific knowhow in all spheres of activity.

6115

CSO: 2700/4

ROMANIA

UTILIZATION OF SECONDARY ENERGY SOURCES PLANNED

Bucharest REVISTA ECONOMICA in Romanian No 39, 27 Sep 85 pp 6, 9

[Article by Gheorghe Manea: "Full Utilization of the Potential of Secondary Energy Resources"]

[Text] In the process of transforming fossil fuels into energy (thermal, electrical, mechanical and so on), only 25-35 percent of their energy content is actually found in energy vectors, the remaining 65-75 percent representing residual energy, which is lost for the most part and which we find under the conventional term "residual energy sources" (RES). The same term is also common for the energy content (tangible heat) of industrial products and byproducts like coke gas, petroleum products, cement, glass, metal worked by means of thermal processes, exhaust gases from diesel engines, cooling water from industry, hot air from inhabited rooms, from zootechnical complexes and so on.

The wide diversity of the nature of the RES in the economy of a country is also found in the wide range of the values of the thermodynamic parameters at which these sources are available (one such parameter is temperature). The size of the source also varies, it being specific to each industrial or economic process in which an energy consumption is involved. For example, in oil refineries (highly energy-intensive installations), which consume for energy purposes 10-15 percent of the crude oil subjected to processing, only 3 percent of the energy is consumed for chemical reactions, the remaining 97 percent constitutes RES and, in the absence of their utilization, is lost into the atmosphere.

The considerable amount of energy contained in RES dictated the concept of RES recovery, so as to reduce, on this basis, the consumption of primary energy. This concept is concretized in the adaptation of the economy to the new energy situation, characterized by rises in the price of fossil fuels and by difficulties in procuring them, to which there are added the decline in energy resources and the degradation of the environment with byproducts from fuel burning and with residual heat from the process of utilizing energy vectors.

The development of the RES-recovery techniques makes it possible--and normal under the conditions of today's technology--to utilize 20 percent of the volume of the RES--a value that draws attention to the particular importance of reutilizing these resources--and, in this way, to minimize energy consumption.

The objective of reducing the consumption of primary energy by 20 percent has focused the attention and concerns of the specialists and the economic decisionmaking bodies (including on a governmental level) on the implementation of the measures needed for RES recovery, an action all the more necessary because, for the majority of the countries, the availability of primary energy resources forms the main restriction on economic development.

RES utilization also acquires a particular importance on a longer term: if the world energy demand increases 23.9 percent by the year 2000, 60 percent of this increase can be covered through RES recovery (at the current level of the recovery technology). In the absence of RES-recovery activity, the residual heat is lost into the atmosphere or goes--with the cooling water--into natural tributaries, causing strong negative effects on the ecosystem. The heating of natural waters reduces the capacity for oxygen absorption and thus the capacity for biological self-purification, favoring the processes of eutrophication of the basins, making them unfit to be used for drinking water and altering the biological conditions for the aquatic flora and fauna. In Romania, for instance, the total used water discharged by industry into rivers has reached over 10 billion cubic meters per year, of which 5.5 billion cubic meters represents thermally polluted cooling water.

The technical means used in RES recovery are well known, in general, and their range is relatively wide and accessible for practical purposes. To the older techniques (the utilization of thermal energy by means of heat exchangers) there are added newly developed techniques like the utilization of thermal tubes, heat pumps, and thermal cycles with organic fluids, the storage of hot or cold water in natural or artificial reservoirs and the later utilization of it, and so on.

Our country, which is in the initial stage of RES recovery, is following the world trend of reduction in energy consumption; for this purpose, heat pumps and thermal tubes have been assimilated into manufacture; the recovery of the heat of flue gases by reheating the combustion air is also practiced; and so on. At the level of the national economy, the effects of RES recovery can be amplified by concentrating the efforts, in the first stage, on those RES that have a large percentage in the country's total energy consumption, such as the chemical industry, the metallurgical industry, the CET [thermoelectric power station], the glass industry, the cement industry and so on. The experiments have demonstrated the possibility and efficiency of RES recovery, such as, for example, at the Pitesti Petrochemical Combine, where, with heat pumps of the type from the Iasi CFS [expansion unknown], 10 gigacalories per hour is recovered, which supplies thermal energy to a residential district with 5,000 apartments. It can thus be considered possible to proceed to implement--on a wide scale--RES-recovery installations throughout the national economy. As an effect, this will lead to the reduction of the total consumption of primary energy, which, at the level of the whole economy, rose continually in the 1973-1983 period, posing special problems in meeting the need.

The residual heat recovered from industry at high thermodynamic parameters is recycled into the industrial processes; that which results at low parameters, due to its large volume, requires high-volume consumers, which cannot be found

except over a wide area, adjacent to the industrial platform. Among the possibilities of utilizing RES at low thermodynamic parameters, the heating of urban dwellings emerges as a prime consumer. Since the experiment at the Pitesti CP [Petrochemical Combine] was concretized in the heating of 5,000 apartments, we can easily realize what an oil refinery with a corresponding volume of 300 gigacalories per hour, a petrochemical combine with 600 gigacalories per hour or an iron and steel combine that discharges about 300 gigacalories per hour means for the national economy. The immense potential represented by the industrial platforms in our country for heating the urban dwellings in their zone of "thermal influence" is thus clear.

It is considered possible for 30 percent of the energy consumed in an oil refinery to be able to be recovered; thus, at a single refinery, it would be possible to recover 300×30 percent = 90 gigacalories per hour, heat with which it would be possible to supply, through the heating network, approximately 45,000 apartments, or the population of a city with over 100,000 inhabitants. At present, the distance between the industrial platform and the edge of the heating network is 5-15 km; however, attempts are being made to increase this distance to 50 km.

Consumers of thermal energy at low parameters can be found in the drying plants located in the vicinity of the industrial platforms; of them, the ones belonging to local industry can be supplied completely through the utilization of RES from industry. Agriculture can also consume thermal energy at low parameters for the heating of hothouses, a situation in which 2 gigacalories per hectare can be utilized. The piscicultural basins can consume hot water from industry (at a flow of 4,000 cubic meters per hour, an output of 300-500 tons of fish per year is secured).

The main economic aspect of RES utilization is the reduction of the consumption of primary energy. As a component part of the complex of measures for energy conservation, the contribution of RES utilization can be found in the following results: in the United States, the per-capita energy consumption was cut from 3.7 tons equivalent of petroleum per year in 1970 to 3.3 tons equivalent of petroleum per year in 1975 and to 3.1 tons equivalent of petroleum per year in 1980; the other countries in the OECD are registering the same trend of decline in energy consumption. In the USSR, the recovery of RES from industry forms a constant activity, with 46 percent of the residual resources being subjected to utilization.

The putting of RES recovery into practice does not require research activity, in general; the equipment is big-series, modular, readily available equipment, which permits the implementation of the equipment needed for RES recovery to be done relatively easily and, as a rule, during the period of stoppage of the industrial installations for the performance of capital repairs. To the advantages there is also added the short period of time for recovering the investments, which varies from 0.5-4 years, in the case of thermal tubes, to 4-7 years, for heat pumps.

RES utilization does away with the additional need for energy (as well as other costs) used to neutralize the pollutants appearing in the process of

generating energy vectors. Knowing that approximately 6 units of potential energy are required in order to actually utilize 1 unit of energy, the attainment of a savings of 1 ton of conventional fuel, for instance, in the final energy consumption entails, through the effect of multiplying the passage of the energy through several phases, a reduction of over 6 tons of conventional fuel. According to the same reasoning, in the transformation of RES into electricity, in the ideal case of thermodynamic yields, the cost of the electricity is cut 3-fold in comparison with the case when petroleum fuels would be used to generate it.

KES recovery also constitutes a solution for making products and manufacturing operations more efficient. In the iron and steel industry, for example, we managed to reduce the energy consumption by 0.07-0.212 gigajoules per ton. In Japan, the investments made in the '70's to reduce the energy consumption in the production of steel totaled \$25-125 million, with their recovery being accomplished in 2 years from putting the recovery installations into operation. In the ferrous metallurgy of the socialist countries, through RES recovery, there was secured in 1990 the reduction of the energy consumption by 19 percent in the USSR, by 18.14 percent in the Czechoslovak Socialist Republic and by 11.84 percent in Bulgaria, in comparison with the total energy consumption. In other countries, the results are similar: 17.3 percent in Japan, 13.3 percent in England, 12.85 percent in the FRG, 15.72 percent in France and so on.

The reduction of energy consumption, as a principal measure in modernizing the manufacturing technologies, means not only the adaptation of industry to the new conditions of securing energy sources but also the causing of positive economic effects (the reduction of manufacturing costs) and ecological effects. The practical accomplishment of the reduction of the total energy consumption is done through the modernization of the manufacturing technologies and production equipment, through the recovery of residual energy sources and manufacturing byproducts, through the restructuring of the assortment of finished products, and so on. Among these measures, RES recovery stands out as being the most effective, due primarily to the short time in which the equipment needed for the RES-recovery process is introduced into industrial installations. The measures for RES utilization in the industrial platforms' own installations or in local industry, in the heating of cities, in agriculture and so on can also be just as effective. The facilities of a financial nature for buying the necessary equipment, the correlation of industry's energy programs with the potential consumers in the zone adjacent to the industrial platforms, and the establishment of stimulative prices that encourage RES recovery and utilization are also essential.

The concept of the energy integration of the industrial platforms can be a working instrument that leads to the territorial minimization of the total energy consumption, permitting the systemic analysis of the energy suppliers and consumers in a zone, with the energy balance being worked out as a unit and with the volume of the RES being determined according to levels of the thermodynamic parameters. This can be the basis for preparing general plans that outline the volume of the investments needed and the stages of the program for concretizing RES recovery. The same concept also dictates a unitary view of the energy balance of the processes occurring over a wide geographical zone

(600-7,000 square kilometers), which presupposes the creation of the suitable institutions for zonal planning, with an interbranch specific character, for RES recovery. These institutions (which, in reality, could be the section of a county planning institute, with a role of general planner) form the important link in the circuit for the wide implementation of RES recovery in the national economy.

Clearly, the adaptation of the national economy to new tasks (like the reduction of energy consumption) also means new forms of organization, without which the reduction of the consumption of primary energy by 20 percent in a short period of time through RES recovery cannot become a viable objective.

12105

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ROMANIA

QUALITATIVE, STRUCTURAL MODIFICATIONS IN AUTOMOBILE PRODUCTION

Bucharest REVISTA ECONOMICA in Romanian No 39, 27 Sep 85 pp 7-9

[Article by Petru Mogos, technical director at the Brasov Industrial Central for Motor Vehicles for Transportation: "Qualitative and Structural Changes in the Production of Motor Vehicles"]

[Text] A result of the policy of socialist industrialization of the country consistently promoted by our party, in the years after the country's liberation a new industrial branch appeared, developed, and distinguished itself--through its products--on both a domestic and a foreign level. It is a question of the automotive industry, whose output has had extremely high rates of growth--quantitative and qualitative--there being assimilated into production new families of trucks, four-wheel-drive cars, automobiles and buses, achieved in a great diversity. This sector of our machine building now appears to us as an impressive industrial complex, composed of big and modern industrial platforms--in Brasov, Mirsa, Cimpulung, Colibasi, Bucharest and Craiova.

The first steps were taken with the decision to specialize the big Brasov "Steagul Rosu" plant in truck production. The production of the SR-101 trucks--a model that corresponded to the manufacturing possibilities as well as to the operating requirements in that period--began in 1954. The SR-101 truck met the immediate needs of the economy, which was equipped with nearly 54,000 units, at the same time paving the way for the achievement of the first specialized Romanian vehicles, of which dump trucks, tank trucks and buses can be mentioned; some components of this truck were used to make the first Romanian trolley buses.

The requirements for the continual development of the national economy placed before the makers of motor vehicles the problem of turning to the manufacture of new types of products, ones of higher quality, with a greater degree of diversification, and attainable under big-series technological conditions, a matter that was concretized in the beginning of the manufacture of the second generation of trucks in 1962--of Romanian design this time--that is, the "Carpati," with 3 tons of payload, and the "Bucegi," with 5 tons of payload. With good reason, the year 1965, when, after the ninth party congress, wide prospects opened up for a future that formerly no one would have dared to predict, must be considered a reference year in the making of Romanian motor vehicles for transportation. The promptings, the orientations and the tasks

mapped out by the secretary general of the party with regard to providing for the achievement of vehicles with higher technical and economic performances, in accordance with the more and more exacting requirements of the domestic and foreign customers, were materialized by the Brasov makers in the beginning of the manufacture of the third generation of motor vehicles for transportation in 1971--equipped with diesel engines this time.

August of last year represented a moment with major significance in the chronicle of the Romanian industry of motor vehicles for transportation: the passage of three decades since the production of the first Romanian trucks. Three decades in which over 620,000 dump trucks, trucks and tractors, 52,000 buses, 135,000 utility vehicles, 664 heavy dumpers and 2,750 trolley buses were achieved. Three decades which represent a giant forward step by Romanian industry and which place Romania among the main motor-vehicle-building countries in the world.

At present, the output of the Romanian automotive industry, excluding sedans and four-wheel-drive cars, is represented by an extremely diversified range of products. Thus, the modern "ROMAN" and "DAC" trucks, equipped with diesel engines of 135-156 horsepower and 256-215 [as published] horsepower, and the tractors of the new "DAC diesel 666 T" and "DAC diesel 888 T" generation, equipped with engines of 256 horsepower and 320 horsepower, respectively, are made in Brasov. Beginning last year, the makers there turned to the production of the vehicles in the fourth generation, equipped with engines from a new family, the V8 of 320-360 horsepower, with axles with a carrying capacity of 13 tons, with cabs with a better design and comfort. The huge diesel and diesel-electric dump trucks in such demand for the big surface mining operations or for the hydrotechnical construction sites are produced on the industrial platform in Mirsa Sibiului. Finally, Bucharest's industrial platform furnishes buses made in dozens of types and versions, trolley buses with static switching, from the third generation, and TV-15, TV-35 and TV-320 utility vehicles, in numerous versions.

Our country's economy continually required the providing of transportation vehicles of the most diverse types, meant for practically all sectors of activity, with higher technical performances, with higher reliability indices, achieved under favorable economic conditions. In order to respond to these major desires, it was necessary to adopt a suitable strategy, one that included extensive actions on the plane of the manufacturing technologies, the supplying of equipment, the constructive conception of the vehicles, the providing of training for the personnel, and the rational utilization of materials.

Starting from the principle of diversification through unification, continual action has been taken regarding the constructive conception of the vehicles; the Brasov Truck Enterprise, possessing three families of engines, axles and cabs and five families of gearboxes--as basic families--is now in a position, for example, to be able to achieve, through the over 2,800 technical specifications for the vehicles in the range of 5-19 tons of payload, a wide assortment of products, capable of meeting any requirement. Within the Brasov IA [Truck Enterprise], the same principle consistently applied also in the field of the manufacturing technologies both for designing the technological

processes proper and for designing and physically achieving the tools, devices and gauges and the mechanization has led to the achievement, approval and current utilization, in a proper fashion, of over 180,000 technological operations and about 200,000 types of SDV's [tools, devices and gauges] under manufacture in the hot, processing-by-cutting and assembly sectors.

The necessity of achieving in serial production the components and subassemblies that go into the manufacture of vehicles under favorable economic conditions--that is, high productivity, precision and qualitative stability and minimal energy, material and tool consumptions--dictated the creation, through self-equipping, of specialized machine tools, machine sets, transfer lines, mechanization and conveyors. Right from the pioneering period in this sub-branch, the Brasov Truck Enterprise has been engaged in a fruitful activity, thus far achieving over 1,000 machine sets, 1,800 different pieces of technological equipment and types of mechanization, 14 automatic lines and 126 technological lines both for its own needs and for various enterprises in the country.

The utilization of modern technological processes (cold and hot extrusion, flange rolling, semiautomatic welding in a CO₂ medium, and cutting in processing centers), in conjunction with the initiation and application of suitable organizational measures (the raising of the degree of containerization and palletization, the adoption of active control on machine tools and of multidimensional control, the providing of the checking of the subassemblies according to structures, the organization of continuous-line manufacture, and so on), caused the labor productivity at the Brasov IA to rise 17.3-fold in comparison with 1954, while the output rose more than 26.3-fold. For a more vivid illustration of these figures, it can be pointed out that, in 1984, if the work there had been done with the same productivity as 30 years ago, the output obtained would have required a number of worker personnel 11.4 times greater than that utilized.

Special attention has been devoted and is being devoted further to the achievement of motor vehicles with higher functional parameters, under conditions of high efficiency. As can also be seen from graphs Nos 1 and 2 [graphs not reproduced], over the years and from one type of truck to another, through redesigning, through the adoption of better construction solutions, through the assimilation of new families into manufacture, the technical and economic operating parameters have been improved substantially, implicitly increasing the competitiveness on a foreign level. The reduction of the tare coefficient and the raising of the payload per vehicle, in conjunction with the reduction of the specific consumption of fuel and the raising of the power of the engines, have done nothing but increase the efficiency in utilizing the trucks, an increase materialized in the growth of the volume of freight transported, the reduction of the consumption of liquid fuel, the improvement of the performances in operation, and so on.

As regards the providing of high efficiency for the producer, one concern deserving mention is that which has involved and involves further the matter of using the materials and, in particular, metal as completely and efficiently as possible. As a result of the steps taken, the average metal-utilization

coefficient rose, at the Brasov 1A, for instance, to 0.85 in 1984, with the value of a ton of metal rising from 20,000 lei in 1954 to 52,000 lei and with the metal consumption having a downward trend from year to year. By utilizing with a sense of thrift the scrap resulting from the operations of stamping and pressing the body panels, 175 different sheet-metal components have come to be achieved at this enterprise, which leads annually to the saving of over 800 tons of metal.

The raising of the technical and organizational potential of the central's units has also created the conditions for assimilating new products in a shorter and shorter period of time, thus providing the possibility of always being in step with the requests of the domestic or foreign customers. Thus, while about 3-4 years were once necessary for introducing a new product into manufacture, this is now done in 1-2 years, and only 3-6 months are necessary for constructive improvements in the products under serial production, as compared with approximately 9-12 months.

Along with meeting the requirements of the national economy, starting in 1956 the premises needed for beginning the exportation of Romanian motor vehicles were created. Autoexportimport, as an exporter of these products, has devoted and is devoting special attention to adapting to the specific conditions appearing on the markets of the world. Through the wide assortment on the export list--with about 2,800 specifications, executed both from our own ideas and on the basis of licenses or actions of cooperation in production with firms in the FRG, France, Bulgaria, Hungary, the GDR and Poland--we are responding to the requirements of the world market for motor vehicles. Besides exporting finished products, we also build assembly lines for CKD [completely knocked-down] and SKD [partly knocked-down] deliveries. A particular importance is accorded to the exportation of automotive components, with the sales volume rising from year to year. Our country participates in all the international fairs and expositions organized in the socialist countries and, in addition, in the most important promotional events, such as those in Nairobi, Hannover, Baghdad, Karachi, Salonika and other places.

For all exported products, technical assistance is provided through Romanian service personnel, as well as spare parts through warehouses specially organized in the partner's country, both during the term of guarantee and during the postguarantee period. In addition, in order for the partner's specialists to know how to operate and maintain the products, we also have training courses either in the central or directly in the buyer's country.

The quality and performances of Romanian automotive products have been recognized on an international level through a number of gold medals won at prestigious international fairs, such as in Zagreb, Plovdiv and Leipzig. At the same time, motor vehicles or diesel engines produced by our machine-building industry have been approved by institutes well known on an international level in France, the FRG, England and so on.

The results obtained thus far by our motor-vehicle-building industry and the experience gained are the basis for the process of the further constructive and qualitative development and diversification of this sector of activity, in

accordance with the various needs of the national economy and the foreign partners. In order for the products made by the specialized enterprises to correspond for the most part to the long-term requirements and in order to keep pace with the latest achievements in the field, the programs for developing the production of motor vehicles provide as main directions of action: the further diversification and modernization of the motor vehicles under serial production (in 1990, the coverage of a range of tonnages between 6 and 40 tons of total weight will be attained, with the manufacturing program of the Brasov IA thus being at the level of the strongest producers in the field); the improvement of the performances and the reduction of fuel consumption, for for which purpose action will be taken regarding the expansion of the utilization of engines with intermediate cooling, the reduction of the specific consumption of fuel, the improvement of the aerodynamics of the motor vehicle, the modernization of the braking installation and mechanism, and the generalization of the utilization of synchronized gearboxes; the reduction of the load factor and the improvement of the tare coefficient through the utilization of suspensions with parabolic springs, the execution of the chassis from metal plate with better mechanical characteristics, the redesigning of subassemblies and individual parts with a high percentage in metal consumption (particularly cast semiproducts), the expansion of the utilization of plastic, especially in the cab; the improvement of the interior comfort by modernizing the cabs under serial manufacture; the raising of the reliability of the trucks and components, from which there derive the raising of the average annual distance to 100,000-140,000 km and the lengthening of the term of guarantee to 1 year or 10,000 km, a matter that will lead to the growth of the competitiveness on the foreign market.

However, no matter how well a product may perform, it cannot be competitive--either economically or technically--if it is not supported by a suitable manufacturing technology. For this reason, even further action will be taken to equip the producing units with machine-tool sets and automatic lines, to increase the degree of multiple tending of the equipment and the degree of robotization of some operations, to provide the automatic and semiautomatic feeding of the presses and machine tools, and so on. The utilization of computer technology in the work of designing the products and technologies will be expanded, new laboratories will be set up with simulative test stands for the new components that are to go into serial production, and the use of climatic chambers for adapting our products for operation in any type of climate will be expanded.

12105

CSO: 2700/16

YUGOSLAVIA

ASSEMBLY DELEGATION DISCUSSES DEBTS, TRADE IN U.S.

AU261707 Belgrade POLITIKA in Serbo-Croatian 17 Oct 85 p 2

[TANJUG Report]

[Text] Washington--The SFRY Assembly delegation which is visiting the United States took part in a round-table discussion about international debts and bilateral economic relations between the United States and Yugoslavia which was organized by the respected local Georgetown University.

The delegation is headed by Miran Mejak, president of the Committee for Economic Relations with Foreign Countries of the SFRY Chamber of Republics and Provinces, and consists of delegates Dusan Gligorijevic, Trpe Jakovlevski, and Vasilije Radic.

Before taking part in the round-table talks, the members of our delegation had a lengthy talk with C.J. Brown, the U.S. deputy secretary of commerce, about how to advance and stimulate the trade between the two countries and in particular about the problem of protectionist measures on the U.S. market and the market of developed countries in general. Mico Rakic, SFRY ambassador in Washington, also took part in the talks.

Yesterday the delegation also visited the offices of the famous American newspaper, the WASHINGTON POST, where they talked to the newspaper's editors about the relationship between the two countries.

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CSO: 2800/53

YUGOSLAVIA

WESTERN STATES SEEK TO LEGALIZE 'UNLAWFUL' GATT RESTRICTIONS

LD311026 Belgrade TANJUG in English 0453 GMT 31 Oct 85

[Text] Geneva, October 31 (TANJUG)--The industrial Western countries seek in the proposed "new round" of multilateral negotiations on trade liberalisation to "adjust" the present rules of the General Agreement on Tariffs and Trade (GATT) so as to legalize some of their unlawful restrictions against imports from the developing countries.

The above was noticed in current consultations within a group of "higher officials" which was charged at the recent special session of the GATT with preparing a possible opening of a new series of multilateral negotiations on securing freer courses in international trade.

The latest round--the so-called Tokyo round--of such negotiations was carried out from 1973 through 1979 and did not prevent the systemic introduction of non-custom restrictions. They are hitting the hardest the access of goods from the developing countries to the markets of the developed countries.

In its so-far consultations on preparing a "new round" of negotiations within the GATT the group of the leading Western countries with the United States at the head has manifested its intention to treat barriers as "realities" that "should be taken into account."

Making their mind known about the list of demands by the developing countries for changes in custom and non-custom measures that affect their exports, the U.S. representatives informed, it was learned, that they are willing to take such demands into consideration provided that their new demands "be met in an adequate way" concerning the initiative for a "new round" of negotiations.

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ASSEMBLY APPROVES CUSTOMS-FREE ZONES

LD020552 Belgrade TANJUG in English 0927 GMT 1 Nov 85

[Text] Belgrade, November 1 (TANJUG)--The Assembly of Yugoslavia has passed a new law on free customs zones. Together with the recently passed law on foreign investments, it offers very wide possibilities for partners abroad to produce, finish off, store and transit their products with no customs nor taxes included.

Under the new law, the Yugoslav authorities issue permits for forming free customs zones at big seaports, river ports and centres close to international airports. The founder of a free customs zone may be only a Yugoslav economic organization which has its rules and price-list at the disposal of foreign partners (ground rent, tariffs for water and electricity consumption).

Just now, there are seven free customs zones in Yugoslavia: In the seaports of Koper, Pula, Rijeka, Zadar, Kardeljevo and Bar as well as the river port of Belgrade. They are called "free zones," but exclusively having storing facilities for goods in transit.

The new law gives much wider content and rights to free customs zones. Factories for fully new production on the basis of duty-free imported raw materials or parts may be founded in new zones. Foreign or mixed capital factories can finish off goods there, process or mount various products meant for export. The only customs obligations for domestic or foreign users come into force at the moment of their wish to have their products exported from Yugoslavia.

A total of 96 free customs zones are making business in the world on such principles now. Excepting China (three free customs zones) Yugoslavia is the first socialist country which approves such reduced customs rates to its foreign partners.

On account of their geographical positions and favourable communications, new customs free zones are expected to attract a considerable inflow of goods in transit between Central Europe and the Middle East as well as intercontinental traffic along Central Europe-boundroads from Asia, Africa and Latin America.

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CSO: 2800/53

YUGOSLAVIA

DEBT SITUATION OUTLINED BY KOVACEVIC

LD061413 Belgrade TANJUG Domestic Service in Serbo-Croatian 1950 GMT 5 Nov 85

[Text] Belgrade, 5 Nov (TANJUG)--Yugoslav debts to foreign countries are steadily decreasing, and also we did not take any financial credits last or this year: We will not ask for any in the next period. By the end of this year we expect to have a surplus of \$600 million and further increased exchange reserves. This was said tonight by Zivorad Kovacevic, member of the Federal Executive Council, at a press conference with foreign journalists in the International Press Center in Belgrade.

In response to journalists' questions, which mostly referred to foreign debts, Zivorad Kovacevic stressed that in future the main accept would be placed on decreasing relative rather than absolute indebtness in order not to threaten imports and production. An agreement in principal on reprogramming debts has been realized with the International Monetary Fund and banks, while negotiations with governments are now under way.

Speaking about the development of the Yugoslav economy, Zivorad Kovacevic stressed that in future Yugoslavia will insist on economic measures in order to create conditions in which the economy could tackle its difficulties through increasing production rather than prices. He also announced severe measures to prevent the accumulation of reserves. This will also have an impact on lowering the rate of inflation, which is envisaged to be under 79 percent by the end of the year.

Kovacevic, while underlining the need for a more determined implementation of the long-term program of economic stabilization, said that conditions are ripe to simultaneously carry out changes in the economic system and implement measures which should ensure the realization of the changes. All measures, from abolishing the positions of the balance of payments of the republics to huge changes in the foreign exchange law and the banking system, will have a major impact on decreasing the influence of state and political structures of the country's economic life. This means, Kovacevic said, that in the struggle against bureaucratic and etatistic tendencies we should make use of the macroeconomic measures.

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CSO: 2800/53

YUGOSLAVIA

BRIEFS

AUSTRIA RESCHEDULES YUGOSLAV DEBT--Belgrade, 25 Oct (TANJUG)--Talks were closed today in Belgrade between the delegations of the Yugoslav and the Austrian Government on rescheduling the principal of the Yugoslav debt to Austria which matures for payment on May 15, 1986. The talks were closed by signing of the minutes under which a 916 million Austrian shilling loan for the refinancing of the Yugoslav debt will be granted to Yugoslavia. [Text] [Belgrade TANJUG in English 1430 GMT 25 Oct 85] /9599

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END

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